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BY-PRODUCTS.

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Editorial Notes

The South Metropolitan Tariff

SINCE our last issue there has been further agitation in South London concerning the alleged inequity of the new tariff introduced by the South Metropolitan Gas Company. The popular Press has done its utmost to fan the flame of public indignation. Protest meetings have been held in several of the Boroughs comprising the Company's area of supply, and there has been a mass demonstration outside the Company's Head Offices in the Old Kent Road. The whole affair, as we said last week, has lent itself so readily to presentation as a political issue that the commercial aspect has been almost entirely obscured as far as the public is concerned. Highly distasteful and very cheap personal attacks on Dr. Charles Carpenter have been a feature of those sections of the Press which never miss an opportunity of trying to persuade what they call the " small " man that he is getting a raw deal in some way or another, and that they alone care anything for his interests.

Mr. Herbert Morrison, M.P., Leader of the London County Council, wrote to Mr. Runciman, President of the Board of Trade, asking for the Board's intervention in the dispute. Mr. Runciman's reply is published on later pages. He pointed out to Mr. Morrison that the Company, in putting forward its new tariff, is acting within the powers conferred by Parliament in 1920, and that he has no authority to interfere with the Company so long as they act within these powers. On the other hand, he intends " to consider before the next session opens whether it is desirable and possible to ask Parliament to investigate the question of the propriety of the Company's present powers," and asks Mr. Morrison to keep him informed of the results of an examination now being conducted on behalf of the London County Council.

On Thursday last Dr. Carpenter collapsed at a Board meeting of the Commercial Gas Company, and was reported to be " very ill." We are happy to state, however, that since then his condition has improved and that the improvement has been maintained. Before Dr. Carpenter was taken ill a letter was drafted on his instructions and it had the unanimous approval of the Board of Directors of the Company. Its publication appeared in the Press over the signature of Mr. F. H. Jones, Vice-President of the Company. The letter, addressed to Mr. Walter Runciman, informed him that should he feel disposed to consider the appointment of an " appropriate " tribunal to investigate the new tariff, its aims and its general effect on consumers of gas, the South Metropolitan Gas Company would raise no objection and would, indeed, be willing to render every assistance by appearing before such a tribunal. The Company, it should be clearly understood, has laid down no conditions as to the nature of the tribunal. The publication of the letter was the signal for a section of the Press to " strengthen " its stunt. Headlines such as " Company changes its tune," " Company will now face inquiry," and the like were given the greatest prominence. The facts are quite the reverse. The invitation to the Board of Trade implies no change whatever in the Company's policy. Never before has the Company been accused of taking advantage of its powers at the expense of the consumer, and since the President of the Board of Trade has no authority to interfere, the Company courteously invited Mr. Runciman to take steps, if he thought fit, so that the tariff may be properly examined in the light of the grievances alleged. As we said last week, the Industry will continue to wish the Company well, and it must realize, if the South Metropolitan is unable to establish its right to a commercial tariff, and to put such a tariff, of its choosing, into operation, the danger that the Industry will be permanently saddled with the flat-rate method of charge.

Smoke Abatement

THE Science Museum in South Kensington is frequented by fathers and mothers taking their children around for interest and education. It is doubtful whether any other free entertainment draws so many of the old, middle-aged, and young together so successfully as this exhibition showing the developments in various forms of scientific achievement which have made possible the degree of comfort which to-day is taken for granted. This month there is being staged in this National Gallery a very important exhibition. It is important because it is a common concern for all to encourage the health and well-being of the community. The aims of the National Smoke Abatement Society are known to our readers, and we think that theoretically all people agree with these aims. It is difficult to believe that in 1936 it should be necessary to impress upon the public

the desirability of providing, at the exercise of some will but little cost, a clean and healthy atmosphere. For years investigations have shown the harmful effects of unnecessary smoke on human life and on vegetation. Where these troubles affect a township—we are thinking of such towns like Nottingham and Leicester—where the presence of smoke would mar the profits of the chief industries, then there is no question whether action should be taken to eliminate smoke as far as possible.

We have spoken of the number of old, young, and middle-aged people who visit the Science Museum, and we think that anyone who knows that institution will agree with us that in educative value it is a living force. Eager-eyed boys and girls regard with imagination, if not understanding, the models—it may be of boilers, it may be of engines—which have been so carefully arranged to display the progress of engineering. For the young the Science Museum at South Kensington has peculiar attraction, and that is the reason why some time ago in the "JOURNAL" we urged that our Industry should be adequately represented. The matter is before the Joint Co-ordinating Committee of the British Gas Federation; and when the scheme is crystallized it should, we feel, be assured of general support.

In the particular section on smoke abatement which occupies considerable and prominent space the whole of this month in the Science Museum two displays—and we are thinking of the layman's point of view—stand out. These are the modest, yet because of this none the less effective, exhibits staged by the British Gas Federation and the London and Counties Coke Association. On our visit to the exhibition this week we were struck by the proportion of the people in the Museum turning, free of charge, knobs regulating that easily controlled fuel gas, and we were able to appreciate the value of this form of propaganda. On more than one occasion we have suggested that one of the functions of the British Gas Federation lies in Gas Industry display. There are, of course, many avenues along which this particular aspect of the work of the Federation may be directed. We have in mind the excellent displays at the British Industries Fair at Castle Bromwich and the co-operative exhibit at the Shipping, Engineering, and Machinery Exhibition at Olympia. Those displays were most striking, and equally effective in a different way is the display at the Science Museum, showing what gas and smokeless fuel can do to provide better conditions for a sun-starved people.

Rational Use of Coal

SMOKE abatement is essentially a neighbourly problem. It seems that one looks to one's neighbour first to make an endeavour to diminish the pall which shuns the health-giving rays of the sun. In all these matters self-interest is a common factor, and the exhibit at the Science Museum indicates where this self-interest lies. Surely it is pleasant to be clean and to know that this cleanliness, by using smokeless fuels, costs no more than the employment of raw coal, the burning of which is a heavy communal expense. The Gas Industry provides two smokeless fuels, the one in gaseous, the other in solid form. Both are smokeless, and in their manufacture cause either little or no smoke. The many who will this month pass through the Science Museum at South Kensington will see displayed there pictorially the gloom which unnecessarily shrouds so many of our towns and cities, and will see also the means by which this cloud can be readily dispersed by the products of the Gas Industry. The lesson to be drawn is that the rational use of coal—we are speaking of bituminous coal—is to render it smokeless and at the same time conserve products which would be wasted were that coal burnt in the open grate.

It is significant that the work of the Coal Utilisation Council is now very largely directed to producing appliances and developing methods to enable raw coal to be burned without producing a great deal of smoke. As we write we have before us a small booklet entitled "Smoke Abatement with Solid Fuel," issued by the C.U.C. Anyone who reads this booklet will appreciate that the C.U.C. itself realizes that it is up against a growing volume of public opinion in favour of smoke abatement. The Council knows that in time—and it may not be long—people will regard a smoky chimney in just the same way as using somebody else's dustbin. The Coal Utilisation Council is asking for, and, indeed, developing, equipment which will consume raw coal with a lesser measure of smoke; and the Fuel Research Board is helping in the matter. To those who see ahead, however, these efforts must appear to be directed from the wrong end of the stick. And has the C.U.C. real belief in the second paragraph of its latest smoke abatement publication that gas-works often are serious offenders on the question of smoke emission. That paragraph of their small yellow and green booklet, which may be in the hands of many of our readers, needs qualification. The persuasive display at the Science Museum at South Kensington should do much to promote the use of gas and solid smokeless fuels, bringing with it better health for the community.

W.P.C.

WE do not intend to discuss whether the World Power Conference is a fine thing or otherwise. We know, however, that more interest is being taken in this growing movement which demands and obtains much Government support. That being so, we suggest that at such an august Conference as was staged in Washington last month there ought to be a proportional representation of all fuel interests concerned. We have spoken to some of the delegates representing the fuel industry of this country, who have returned from what they are agreed has been a worth-while excursion. The hospitality shown on the other side of the Atlantic was in keeping with the reputation of the United States of America. We have in mind the visit of The Institution of Gas Engineers to the States in 1933, and this no doubt accounts in large measure for the lack of gas engineers who visited America this year. So many of our readers had already gained an insight into how the Gas Industry is progressing, and why it is flourishing, in the United States. Yet, after all, the Institution visit in 1933 was a sectional affair compared with a World Power Conference. We have before us the list of those from our own country who joined in the Conference, and the delegates concerned with the electrical industry outnumbered those representing gas interests in the ratio of 5 to 1. In general, it cannot be said that the Gas Industry as a world-wide organization pulled its weight.

There are, of course, countries where gas, due to the peculiar natural resources, does not and cannot play a predominant part. That does not apply to this country, nor does it apply to America; but the view has been put to us that the general impression to be gained by any objective onlooker at the last World Power Conference would be that world power consists for the most

part of electricity. We have been told about the enthusiasm for electricity expressed numerically at the various sessions at the Conference; throughout, discussion of electrical possibilities held sway. We have read the general reports dealing with particular sections of the Conference Papers, and we have found—and we think those who have studied the reports will agree—that electricity stalks high while gas humbly treads its way. To many who are concerned with fuel problems this may seem strange; and our purpose in bringing to the attention of the Gas Industry this question of representation at the World Power Conference is to ask whether our Industry, believing in the merits of the many products it makes, intends to ensure that the governments of the different countries shall not ignore its good work. In an indirect way public opinion is bound to be swayed by these Conferences; and our Industry should make its mark on the international map of competing fuel industries.

Co-operative Display

THE Gas Industry is in the enviable position of being able to assist every class of domestic, commercial, and industrial consumer who is in any way concerned with the application of heat. Here, then, lies a splendid opportunity for co-operative effort in the staging of displays of apparatus suitable for many different types of commercial and industrial work. The opportunity lies, of course, rather with the larger gas undertakings, and particularly with those in whose areas the various Industrial Gas Development Centres have their headquarters.

As an example of co-operative displays we may quote the fish-frying trades exhibition organized by the Newcastle-upon-Tyne and Gateshead Gas Company, which was referred to in the "JOURNAL" last week. In this instance, some four hundred members of the frying trades in Newcastle and the surrounding districts visited the exhibition, which was supported by many of the leading gas range and equipment manufacturers. Incidentally, as a pointer to the actual monetary value of such an effort, it may be mentioned that appliances worth more than £1,300 were sold during the few days of the Newcastle exhibition; while, doubtless, an immeasurable amount of goodwill was also created among both manufacturers and consumers concerned. The Newcastle Company, as is well known, have on more than one occasion been instrumental in organizing displays of this nature, and their enterprise has been well repaid.

In addition to fish-frying, there are, of course, such trades as bread-making and confectionery, general hotel and restaurant catering, central heating for all classes of building, and industrial applications of heat in countless forms, all of which would be of interest to a vast number of people who are individually concerned with the economical use of heat in various processes. To provide adequate and effective display in these competitive days demands the co-operation of gas undertakings and appliance manufacturers. It is, of course, desirable that such co-operative efforts should not only bring the various manufacturers of appliances together, but—as in the case of the Newcastle exhibition—that surrounding gas undertakings should also have the opportunity of inviting interested parties from their own areas to attend. In this way will such exhibitions be of the greatest value both to manufacturers and consumers over a wide area. Primarily, these efforts aim to promote the extension of gas throughout the area concerned; but at the same time they do a great deal to raise the standard of trade in the area by introducing to those chiefly concerned some of the latest gas appliances at their disposal—appliances which, in the ordinary course of events, they might not have the opportunity of inspecting.

Gas Journal Shewring Fund

Donations are invited to the Fund, full particulars of which were given in the "JOURNAL" for July 22. The Management of the Fund is in the hands of Messrs. F. G. Shaw (Buxton), W. W. Townsend (Colchester), and J. Bridge (Elland). All expenses having been guaranteed, the whole of the sums received will be applied, without any deduction whatsoever, to the benefit of the widow and children of Harold Shewring, by whose tragic death earlier this year they were left in distressed circumstances.

Cheques should be made payable to the "GAS JOURNAL," and crossed "Shewring Fund Account." All donations will be gratefully acknowledged by the Editor, who is Treasurer to the Fund.

Forthcoming Engagements

Oct.

8.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting and Paper by Mr. H. Hollis.

10.—SCOTTISH WESTERN JUNIORS.—Opening Meeting at Glasgow. Presidential Address of Mr. J. Webster.

10.—MANCHESTER AND DISTRICT JUNIORS.—Annual General Meeting at Widnes. Presidential Address of Mr. T. Caldwell.

10.—WALES AND MONMOUTHSHIRE JUNIORS.—Opening Meeting at Swansea. Presidential Address of J. H. Chapman.

12.—GAS COMPANIES' PROTECTION ASSOCIATION.—Committee Meeting at 5, Victoria Street, S.W. 1, 2 p.m.

12.—I.G.E.—Finance Committee at 1.45 p.m.; Membership Committee at 2.15 p.m.; General Purposes Committee at 3 p.m.; Benevolent Fund Committee of Management at 4.30 p.m.

12.—WOMEN'S GAS COUNCIL.—Executive Committee at 11.30 a.m. Branch Secretaries meeting at 2.30 p.m.

13.—I.G.E.—Council Meeting at 10 a.m.

13.—FEDERATION OF GAS EMPLOYEES.—Central Committee Meeting at Grosvenor Hotel, S.W. 1, 11.30 a.m.

13.—N.G.C.—Meeting of the Central Executive Board at Grosvenor Hotel, S.W. 1, 2.30 p.m.

14.—I.G.E.—Board of Examiners at 2.30 p.m.

14.—SCOTTISH WESTERN JUNIORS.—Visit to Colvilles, Ltd., Dalzell Steel and Iron Works, Motherwell.

15.—EASTERN COUNTIES ASSOCIATION.—Autumn Meeting at Chesterfield.

16.—LONDON AND SOUTHERN JUNIORS.—Opening Meeting and Presidential Address of R. Summerson.

16.—B.C.G.A.—Scottish Conference at Aberdeen.

17.—YORKSHIRE JUNIORS.—Annual General Meeting, Leeds University. Address by C. S. Shapley.

17.—WESTERN JUNIORS.—Visit to Stapleton Road Works, Bristol. Paper by A. Facer.

20.—I.G.E.—Gas Education Executive Committee at 11 a.m.; Gas Education Committee at 2.30 p.m.

22.—COKE OVEN MANAGERS' ASSOCIATION.—Annual Dinner at the Hotel Victoria, Northumberland Avenue, W.C. 2.

23.—MANCHESTER DISTRICT ASSOCIATION.—Meeting at the Midland Hotel, Manchester, 1 p.m.

24.—WESTERN JUNIORS.—Opening Meeting at Bristol.

24.—SCOTTISH JUNIOR ASSOCIATION.—Joint Visit to R. & A. Main, Ltd., Falkirk.

30.—B.C.G.A.—Eastern District Conference at Grimsby.

Nov.

2.—BRITISH GAS FEDERATION.—Second Annual General Meeting at Grosvenor House, Park Lane, W., at 3 p.m.; Third Annual Dinner at Grosvenor House at 7 p.m.

3.—I.G.E.—Council Meetings, 9.30 a.m. and 4.30 p.m., at the Institution of Mechanical Engineers.

3 and 4.—I.G.E. Autumn Research Meeting.

Personal

On Thursday last Dr. CHARLES CARPENTER, President of the South Metropolitan Gas Company, collapsed at a Board meeting of the Commercial Gas Company, and was reported to be "very ill." We are glad to be able to announce, however, that his condition has since improved and that this improvement is being maintained. The latest statement as we go to press is that Dr. Carpenter is making slow but steady progress, and has been ordered complete rest and quiet.

The universal sympathy of the Gas Industry with Dr. Carpenter in his enforced inactivity at the present juncture was evident at the B.C.G.A. Conference at Bath. A suggestion early in the first business session that a telegram of condolence, and best wishes for a speedy recovery, be sent to Dr. Carpenter met with a reception which left no doubt of the feelings of the assembly.

* * *

At the Ordinary General Meeting of the Leamington Priors Gas Company on Sept. 29, the Chairman, Dr. Harold Mason, J.P., announced the retirement of Mr. W. E. T. HEMS from the position of Secretary "after sixty-one years' valued service with the Company."

Dr. Mason thought the shareholders would be interested to know that as long ago as during Dr. Thursfield's Chairmanship a pension had been promised to Mr. Hems, and speaking for the Directors and shareholders—and, he believed, for every employee and customer as well—he expressed the hope that Mr. Hems might be spared many years of quiet happy life with his daughter and son-in-law. The Chairman then handed Mr. Hems a cheque with the best wishes of the Directors.

Mr. Hems's all-round popularity was shown by the applause when he rose to acknowledge this gift. Mr. Hems also thanked the Chairman for the help he had always given him in the performance of his duties, and expressed the pleasure he felt in realizing that he had so many friends connected with the Company, on the Board of Directors, among the shareholders, members of the staff (all of whom had been most loyal to him) and the workpeople among whom he had very many friends of long standing.

* * *

We learn that Mr. GEOFFREY FITTON, B.Sc., Assistant Engineer to the Stroud Gas Company, has been appointed Assistant Engineer and Manager to the Dewsbury Corporation Gas Department at a commencing salary of £300 rising to £360 per annum.

* * *

The Southport Gas Committee have appointed Mr. WILLIAM EWART PLEVIN, B.Sc., Assoc.M.Inst.Gas E., Romford, to the established post of Deputy Engineer and Manager.

Obituary

The death took place last week of Mr. A. B. HANBURY-SPARROW, of Hillside, Church Stretton, at the age of 73 years. Mr. Sparrow had been a Director of the Wolverhampton Gas Company for 32 years, was elected Vice-Chairman of the Board in 1916, and Chairman in 1922. He was a Justice of the Peace for Shropshire and was Lord of the Manor for Eaton and Rushbury.

News in Brief

The Band of the Glasgow Corporation Gas Department won the Besson Cup and £10 award which is the first prize in the Champion Festival of the Scottish Amateur Band Association which was held at the Music Hall, Edinburgh, on Oct. 3. The conductor is Mr. H. Bennett. Some twenty bands took part in the competition. In addition to the "first," the *Daily Record* medallion was awarded to John Hoggans, of the Gas Department Band.

The Two First Prizes in the Tradesmen's Tableau section at both the South Shields and Jarrow Carnivals, arranged in aid of local charities, were won by the South Shields Gas Company. The exhibit portrayed a modern bungalow in miniature (quarter actual size) completely equipped with small model furniture and appropriate gas apparatus and fittings for each apartment, the sitting room, two bedrooms, kitchenette, bathroom, and dining room being shown. The garden, furnished with actual turf and plants, gave the display a life-like representation. The entry was much admired and favourably commented upon.

The Popularity of the Two-Part Tariff has prompted the Bradford Corporation Gas Department to formulate a scheme, which has now been submitted by the Gas Committee for City Council approval, under which the tariff will be offered to prepayment meter consumers as from the December readings. The scheme is on a similar scale to that of the past three years to ordinary meter users. In the case of prepayment meter users it will mean that, after paying their proportionate standing charge according to type of property, they will get 40 cu.ft. of gas (equal to five units) for a penny as compared with 19 cu.ft. under the present flat rate charges. Facilities will also be arranged so that the standing charge can be paid by weekly coin instalments into the meter; and similarly with instalments for hire and hire-purchase appliances.

Amalgamation and Grouping

Stellite. Ltd., and Conway.

The Conway Corporation have accepted the offer of Stellite, Ltd., for their Gas Undertaking, which will be taken over as from Oct. 1, 1936, subject to Parliamentary sanction being obtained.

South Metropolitan Tariff

A Tribunal Suggested

The following is the reply of Mr. Runciman, President of the Board of Trade, to Mr. Herbert Morrison, M.P., Leader of the London County Council, who invited Mr. Runciman to support the London County Council's request for a suspension of the new scale of charges of the South Metropolitan Gas Company:

"The Company, in putting forward their new tariff, are acting within the powers conferred on them by Parliament. In 1920 the Company obtained authority from Parliament to charge for gas under what is known as the basic price system. At that time the system was an innovation. It differed from the systems of control under which gas companies had previously worked in the important respect that dividends were made to depend on the average price of gas as sold to all consumers and not on the price to the ordinary consumer.

"The Board of Trade from the outset had doubts as to the merits of this new system of control, and from time to time expressed those doubts to Parliament in connection with Bills promoted by gas undertakings. The matter came to a head in 1928 on a Bill promoted by the South Suburban Gas Company, with which the South Metropolitan Gas Company is associated. As a result of the Board's representations on the basic price system this Bill was considered by a Joint Select Committee of the Houses of Parliament. The Board pointed out to the Committee 'that on the information available the basic price system, though purporting to be a price regulating system, does not itself in practice regulate even the average price of gas

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Page 14. CAERNARVON. W. Phairn appointed E., M., & S., vice W. M. Ruxton, retired.
Page 38. LEAMINGTON. W. E. T. Hems, S., retired.
Page 60. SEAHAM. Undertaking acquired by Sunderland Gas Company.
Page 82. DINGWALL. G. M. Tulloch appointed E. & M., vice J. Young, resigned.
Page 90. NEWMILNS. W. Phairn, E., M., & S., resigned.
Page 90. PITLOCHRY. J. Young appointed E. & M., vice A. M'Alpine, retired.
Page 128. NEWCASTLE (Australia). W. Warhurst appointed E., vice J. Mackenzie.

and that it certainly affords no safeguard to the only consumer—the ordinary householder—who may be said to require protection, because a low average price may be obtained by giving large discounts to special price consumers, notwithstanding that high prices are charged to the ordinary consumer.' The Committee, after due consideration, allowed the Bill to proceed.

"I should make it clear that I have no authority to interfere with the Company so long as they act within the powers given them by Parliament. Moreover, this particular Company is in an exceptional position, as the basic price per therm which governs the relation between its prices and its dividends, is prescribed in its own Act, and is not subject to a revision by the Board of Trade.

"There is, therefore, no ground on which I can intervene, but I intend to consider before the next Session opens whether it is desirable and possible to ask Parliament to investigate the question of the propriety of the Company's present powers. In this connection you will no doubt be good enough to arrange for me to be informed of the results of the examination which is now being conducted on behalf of the L.C.C."

On Oct. 2, the South Metropolitan Gas Company wrote to the President of the Board of Trade as follows:

Sir,—Dr. Carpenter was taken ill yesterday afternoon, otherwise this letter would have come to you over his signature.

It was drafted yesterday morning on his instructions, for presentation to his colleagues, and has been unanimously approved by them.

In the course of your letter to Mr. Morrison, Leader of the L.C.C., which appeared in the Press on Oct. 1, you mentioned that you have no authority to interfere with the operation of this Company's new tariff.

Nevertheless, if you would feel disposed to consider the appointment of an appropriate tribunal to investigate the tariff, its aims and its general effect on consumers of gas, this Company would raise no objection and would be willing to render every assistance by appearing before such a tribunal.

If you would care to see me, I would place myself at your disposal.

I am, sir, your obedient servant,

(Signed) F. H. JONES,
Vice-President.

South Metropolitan Gas Company,
709, Old Kent Road, S.E. 15.

Gas Assists in Hair and Beauty Fair

Hot Water for the Competition

Though unfortunately few people realized it, gas played an important part behind the scenes in connection with the hair-waving competitions at the Hair and Beauty Fair, recently held in the Empire Hall at Olympia.

While we cannot lay claim to any considerable knowledge of the intricacies involved in making that perfect "perm" we so often have cause to admire, we are nevertheless informed that hot water is an essential factor in the success of various kinds of hair waving.

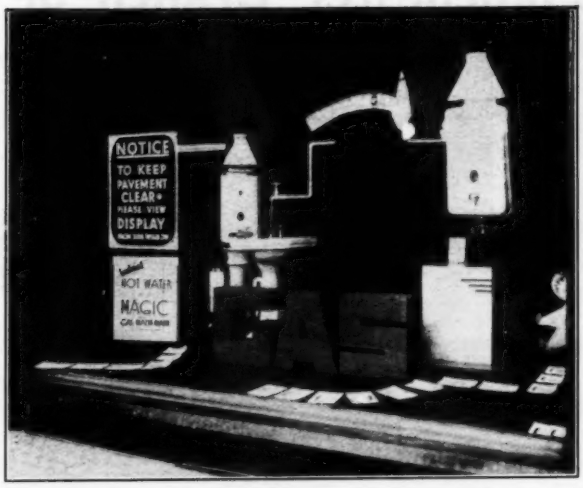
A score or more competitors took part at one time in the various national and international hair waving contests held in connection with the Fair; and it will therefore be readily appreciated that a considerable quantity of hot water must be immediately available for the entrants at a turn of the tap. The difference between hot and tepid water, we presume, might have meant the difference between success and failure in the contest.

Gas was therefore chosen as providing in the most reliable and efficient manner the necessary hot water with the minimum amount of installation trouble, and Thomas Potterton (Heating Engineers), Ltd., provided the apparatus, which took up very little room and was conveniently placed in the "wings" of the competition square.

The installation consisted of two No. 2 "Empire" gas boilers, surmounted by a 75-gallon copper storage cylinder. These boilers have luminous burners and are controlled by means of bi-metal thermostats. In normal circumstances Potterton's "Empire" lagged storage sets use cylinders made of mild steel plate throughout and galvanized; but the particular circumstances of this temporary installation made the use of a copper cylinder desirable—so that it could be conveniently removed and utilized again elsewhere without deterioration of the interior.

A Potterton lagged storage set in white finish was also displayed behind the scenes for hairdressers to examine, while gas-heated airing cabinets were also in use for various drying purposes.

An Effective Water Heating Display



This effective display, featuring "Ascot" gas water heaters, was arranged in the chief showroom of the Bournemouth Gas and Water Company last month.

Gas Meter Testing at Edinburgh

Increased Work

The Annual Report upon the working of the City of Edinburgh Gas Meter Testing Department for the year May 16, 1935, to May 15, 1936, presented by the Official Inspector, Mr. W. Gordon, states that the number of meters tested and examined amounted to 65,572—540 wet meters and 65,032 dry meters; fees to the amount of £4,079 were earned; an increase of 2,200 meters and £199 in fees as compared with the corresponding period of 1935. The total number of meters verified by the Department since its institution in 1861, up to and including May 15, 1936, amounts to 4,299,455, the fees for the same period being £155,862.

In January, 1935, the Magistrates authorized the installation of sixteen new standard test holders for use in the Department. The instruments have now been constructed to the Department's Specification by a local firm. After lengthy experiments it was decided to construct the cylinders for the new holders of Monel metal. The tanks are made of cast iron, all brasswork being chromium plated. The holders and the necessary testing equipment are erected in the respective District Testing Stations. There are now seven District Testing Stations in Edinburgh and Leith, under the jurisdiction of the Magistrates (the Local Authority for the Administration of the Sale of Gas Acts).

Showroom Display at Middleton

This night photograph shows the display arranged by the Middleton Gas Department in conjunction with a successful series of cookery demonstrations given in the demonstration room of the new showrooms by General Gas Appliances, Ltd.

Manchester Branch of the W.G.C.

Our photograph shows members of the Manchester Branch of the Women's Gas Council arriving at Richmonds Works on Sept. 30.

Visit Richmonds Warrington Works

On Wednesday, Sept. 30, over 500 members of the Manchester Branch of the Women's Gas Council travelled by special train from Manchester to the Works of Richmonds Gas Stove Company, Ltd. (Radiation Ltd.), at Warrington, the visit having been arranged by the Manchester Corporation Gas Department. The Lady Mayoress of Manchester (Mrs. Stone Williams), President of the Manchester Branch, showed her special interest in the occasion by being present, and was accompanied by Lady Davey; Mrs. Jackson (wife of Councillor Jackson, Chairman of the Manchester Gas Committee); Mr. J. H. Sillitoe (Commercial Manager and Secretary of Manchester Gas Department), Mrs. Sillitoe, and Mrs. Sillitoe, Senr.; Mrs. Cadman; Mrs. Barker; Mr. and Mrs. Packer; Miss Robinson (Organizing Secretary, Manchester Branch, W.G.C.); Mr. A. Cook (Engineer and Manager, Warrington Gas Department) and Mrs. Cook; Miss Tripp (Hon. Secretary, Manchester Branch, National Smoke Abatement Society); Mrs. Brereton Fairclough (President, Warrington Branch W.G.C.); Miss Whitworth (Organizing Secretary, Altrincham Branch W.G.C.); Mrs. Hunter (Organizing Secretary, Manchester Citizens' Association); Miss E. Kirkby, M.R.S.T., M.C.A. (Radiation Research Kitchen); Mrs. Hayhurst, and many other ladies. The visitors were welcomed by the Mayor and Mayoress of Warrington, Alderman and Mrs. J. Poole.

On arrival at the Works the 500 ladies were divided into groups, each in charge of a competent guide, and the tour of the Offices and Works began.

The Warrington Works.

Established in Warrington in 1890, the present large and imposing factory is situated on the banks of the Manchester Ship Canal and is equipped throughout with modern plant. The Works are laid out on ground floor level, facilitating transport of materials and work generally.

The foundry is always a revelation when visited for the first time, and never loses its fascination however frequently it may be visited. The work in progress all over the vast area of the foundry presents a scene not easily forgotten. The castings are taken from the foundry to the adjacent dressing shop, where they are "fettled" (cleaned), dressed, and examined before being passed on to the castings stores, which temporarily house the castings, each type in its separate section, ready and easily accessible when needed. The immense variety of these castings occasioned no little surprise. Passing from the foundry, the dressing shop, and the castings stores, the visitors were shown the grinding and polishing shops.

A visit was next paid to the machine shops where rows of drilling, counterboring, and tapping machines cope with thousands of components. In an adjacent shop it was seen how machine tools are made and kept in condition for cutting a multiplicity of metal parts which have to be "machined." The sand blasting department created considerable interest. Passing on, the visitors were next taken to the very extensive and ever-growing enamelling departments where much time was spent examining the two and distinctly different processes of enamelling on cast-iron and on sheet metal. Thousands of "Bungalow" "New World" cooker parts as well as components of other cookers were here seen in various stages of these enamelling processes. Each party was conducted through the chromium plating shops and on to the special department which deals with the Radiation "Regulo" automatic oven heat controllers. Here the assembly and testing processes were watched with close interest. The principal manufacturing side of the business having been seen and the co-ordination of the departments explained, the visitors were next conducted through the assembly and fitting shops. To these points a constant stream of component parts of all kinds flow from every other section of the Works. Castings, cooker bases, tops, door frames, enamelled sheets, burner bars, "Rado" boiling burners, brass parts, "Regulo" oven heat controllers, oven burners, shelves, and so on, coming through at an orderly rate to the points where all sizes of "New World" cookers for domestic use and also double and treble oven ranges for hotels and restaurants are built and finished. To the fitting shops also come gas fire castings, fire bricks, burners, radiants, &c., for the construction of High "Beam" fires, and the process whereby these fires receive their beautiful lustre coloured finishes was also watched with considerable interest. In addition to cookers and fires, the visitors also saw radiators, gas irons, and a multiplicity of other gas appliances take shape under the skilled hands of the fitters before being despatched to all parts.

Supervision of Detail.

The party next visited the departments devoted to the production of water heating equipment. Here they had explained to them the various intricacies which have to be surmounted in the production of storage water heaters, sink heaters, geysers, water boilers for teas, wash boilers, greenhouse heaters, and many other water heating appliances. All present were able to acquire a clear impression of the magnitude of the undertaking and a close appreciation of the care and skill exercised in the pro-

duction of modern gas apparatus. The social and sports side of Richmonds organization was not overlooked and the visitors were much impressed by the adjacent sports pavilion and grounds and the general arrangements made for the welfare of the Company's employees.

At the conclusion of the tour the whole of the party was entertained to tea, after which the Mayoress of Warrington rose to welcome the visitors and said that it was a great privilege and an honour to welcome so important a gathering as the Manchester Branch of the Women's Gas Council and their friends to Warrington. It appeared to her that the organization, and all such organizations, give to every woman a real opportunity for service if they would care to take it. She had also been privileged to visit the Works of Messrs. Richmonds, before that day, and had found that there was a real link between the commodities manufactured there and their homes which would make for comfort and cleanliness.

The Mayor of Warrington followed with a happy speech in which he referred to the value of the Gas Industry in promoting health in our towns and cities. He also gave interesting details of the many important residuals derived from coal during the process of carbonization.

The Lady Mayoress of Manchester responded on behalf of the visitors and said that she felt sure every woman present would have recognized the arduous tasks and the many different processes employed in the production of the firm's stoves they had seen being made that afternoon. The Women's Gas Council in Manchester started with 115 ladies and, to her astonishment, this had grown and grown until to-day they had reached their present gratifying numbers. It would be her constant aim to do all she possibly could to promote the interest and further development of the Manchester Branch.

Care, Knowledge, and Skill.

A short address was next given by Miss E. Kirkby, of the Radiation Research Kitchen. Miss Tripp proposed a vote of thanks to the Richmond Company and this was seconded by Miss Robinson, Organizer of the Manchester Branch, W.G.C. Responding, Mr. Robert Poole thanked them for the vote of thanks which they so warmly passed to the Richmonds Gas Stove Company. "You have seen, I hope, this afternoon," he said, "something of the care, the knowledge, and the skill which goes to the construction of our apparatus. We try to the best of our ability, and with a knowledge borne of a very considerable experience, to give you for use in your homes the most efficient and the most economical means of cooking your food, warming your home, and heating your hot water. The Manchester Gas Department supply the best gas they can at the very lowest price and they fit your stove in most skilfully, and in a perfect manner. Now all those efforts which we try to put into the construction of our apparatus are wasted unless that apparatus is used to the best advantage, and in that is included not only the best means of cooking as has been touched on by Miss Kirkby this evening, but also in the proper adjustment and usage of that apparatus. One of the objects of the Women's Gas Council that has been so fully put forward by your President, the Lady Mayoress, is to see the apparatus provided for you is used to the very best advantage."

Mr. Poole concluded his remarks by thanking all present on behalf of the Company.

Showrooms at Winscombe

Weston-super-Mare's Progress

The hope that gas for Weston-super-Mare and district will be produced at an even cheaper rate than at present was expressed by Mr. Henry Butt, Chairman of the Weston-super-Mare and District Gas Company, when he spoke at the opening of the Company's splendid new showrooms at Winscombe on Tuesday, Sept. 29.

The showrooms, which were opened by Mr. H. Stanley Taylor, President of the British Commercial Gas Association, have been attractively designed and built in pleasing modern style. The exterior appearance is very modern, bronze metal, oak, and multi-coloured facing bricks blending to give a very satisfactory finish. On the ground floor are the main showrooms and the staff office. There are two sections, one for the display of kitchen and bathroom fittings and the other for living room equipment. The flooring and panelling are of oak and noteworthy features are panel heating and latest switch gas lighting. There are living quarters over the showrooms.

Mr. Butt presided at the opening ceremony, and among those present were Capt. and Mrs. H. G. Picton Davies, Mr. and Mrs. Claude Lalonde, Mrs. B. Kelson, Mr. Wallace Wilson, Mr. James Taylor, Engineer to the Weston Gas Company, and Mr. J. Marlow, Secretary.

Mr. Stanley Taylor was introduced by Mr. Butt.

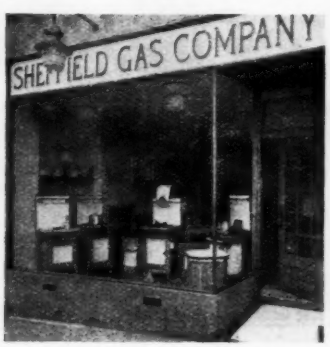
The new building, Mr. Butt observed, would be of great service to Winscombe. "Our keynote is progress," he continued. "We have taken over Worle, Cheddar, Highbridge, and Burnham-on-Sea, and there is not much left to take over, but if there were we would try to do so. We are going in for great expenditure at our works, installing up-to-date equipment second to none in the country. We shall be spending about £65,000 on it and hope to be able to produce gas at a much more reasonable figure than we are doing at the moment. We desire to give the public the best we can. We shall, however, have to pay the costs of the new building out of revenue instead of capital, as it is a replacement, so we shall not be able to make any reductions for three or four years, but after that it will be our aim to do so."

Mrs. Henry Butt then presented Mrs. Stanley Taylor with a bouquet, and Mr. Taylor, who had previously unlocked the door of the new premises with a key handed to him by Mr. Darby, expressed thanks for the gesture towards his wife. During his term of office as President of the British Commercial Gas Association, nothing had given him greater pleasure than being invited to open those premises by his Somerset friends and neighbours. He was convinced that rationalization and absorption of the smaller concerns by well-established companies was the real salvation of the Gas Industry. Things to-day were very different from what they were 50 or 60 years ago.

Nowadays there were many forms of competition. "I am not foolish enough to say that there is no competition from electricity," he added. "We both realize that we are both wanted."

A vote of thanks to Mr. Taylor was moved by the Vicar of Winscombe, the Rev. H. P. Boulton. Mr. Alec Brown seconded and expressed the appreciation of the public generally to the Company.

Sheffield Company Open New Branch Showroom at Bakewell



Our photographs show three views of the attractive little Branch Showroom recently opened by the Sheffield Gas Company in the Derbyshire township of Bakewell.

Gas Progress in North Kent

Interesting Installations at Bexleyheath

In spite of—or, as many in the Industry prefer to say, *because* of—severe competition, gas is forging steadily ahead in the Bexleyheath area of the South Suburban Gas Company. This is a district which has grown almost out of all recognition during the past few years, and is still the scene of considerable building activity, particularly the smaller type of residential property—where, as is only too well appreciated, gas sales do not come just for the asking.

The Barnehurst Branch of the Kent County Library, showing the neat arrangement of the Gas-Fired Central Heating Radiators.

Bexleyheath consumers are, in the first place, fortunate in having at their disposal what must be one of the finest showrooms anywhere in the vicinity. Erected some four years ago, these premises command an excellent position in Broadway—the principal shopping centre for the district—and two large windows front on to the street, giving a good view of the spacious and well laid-out interior. All types of domestic apparatus are effectively displayed, with particular attention to the new colour finishes for gas fires, which are applied by the Company at their own shops. A counter faces the main entrance, while a neat little tiled ante-room is set aside for the demonstration of water heating equipment. Here an attractive tiled alcove exemplifies that useful kitchen combination of gas cooker and coke boiler finished in the same coloured enamel, while opposite are shown alternative design of gas water heater. Gas lighting fittings are well to the fore, and indicate once again that this Company, at any rate, do not intend to allow their lighting load to go by the board without a strenuous effort to retain it. To this end, very pleasing fittings are displayed, while a particular point is made of switch control.

Commodious Demonstration Room.

From the back of the main showroom a panelled stairway, illuminated by gas lamps set above an amber-coloured laylight, giving a cheerful sunlight effect, leads to a fine demonstration room above. This room is capable of accommodating comfortably (we stress *comfortably* because particular attention has been paid to providing suitable chairs) not far short of a hundred persons, and a well-equipped demonstration platform at one end is set out as an up-to-date all-gas model kitchen, where cookery lectures are given twice a week. The demonstration room is warmed by radiators of pleasing appearance and effectively illuminated by switch-controlled ceiling lamps, together with wall brackets.

It is understood that this demonstration room is in frequent demand by local institutions for meetings and other gatherings—all of which is valuable to the Company in helping to keep gas in the public eye.

So far as gas sales go, the Bexleyheath dsitrict is more than holding its own. Though all the main public lighting is by electricity, there is a fine piece of parade lighting in Broadway. It is noteworthy that for some time past now the local office have been putting out a steady number of gas water heaters each month—a very commendable achievement. Moreover, considering the class of property served, refrigerator sales have also been good. The Company are, of course, reaping considerable benefit from the recently introduced "dealer co-operation" scheme, to which reference was made in the "JOURNAL" for Sept. 23 last, and the representatives are bringing in an excellent volume of new business.

Gas Warms Local Swimming Bath.

In July of this year the Bexley Urban District Council opened one of the finest open-air swimming baths to be found in the neighbourhood—and the contract for

A General View of the fine new Open Air Swimming Bath at Bexleyheath, where 650,000 gallons of Water are kept at an Even and Comfortable Temperature by means of Gas Boilers.

keeping the water at a temperature of round about the 70° F. mark was secured for gas.

Set in the beautiful surroundings of Danson Park, this swimming bath measures some 165 ft. by 90 ft., varying in depth from 10 ft. to 3 ft., with a total water capacity of 650,000 gallons. It is complete with cascade, water chutes, paddling pools, showers, and an up-to-date café, and since the opening more than 70,000 bathers have enjoyed its amenities.

Water from the deep end is pumped through the filtration and chlorination plants, thence passing along to re-enter the bath at the shallow end. But before this, a predetermined quantity of water is by-passed through the gas boilers. These consist of two No. 3-GB-10 " Ideal " boilers, having a rated output of 910,000 B.Th.U. per hour each, complete with adjustable thermostatic control, Peebles governors, and draught diverters, thus eliminating the risk of down-draught affecting the combustion. The burners are of the natural draught luminous type.

The gas supply is brought into the boiler room through a 6-in. service, and passes through a 6,000 cu.ft. per hour meter, which is neatly fitted up on the wall so as to economize floor space. The boilers are normally set to provide an outlet temperature of 130° F., and this hot water rejoins the main flow from the filtration and chlorination plants before passing back to the bath. All exposed pipe lines in the boiler room are well lagged to prevent heat loss. During the night time, while it is not necessary to keep the filtration and chlorination plants at work, it may still be advisable, if the nights are chilly, to maintain the heating equipment in operation so that the water temperature will not have fallen to too low a level in the morning. For this purpose an additional pump is provided in the boiler room to circulate the water direct through the boilers when the filtration plant pumps are cut off.

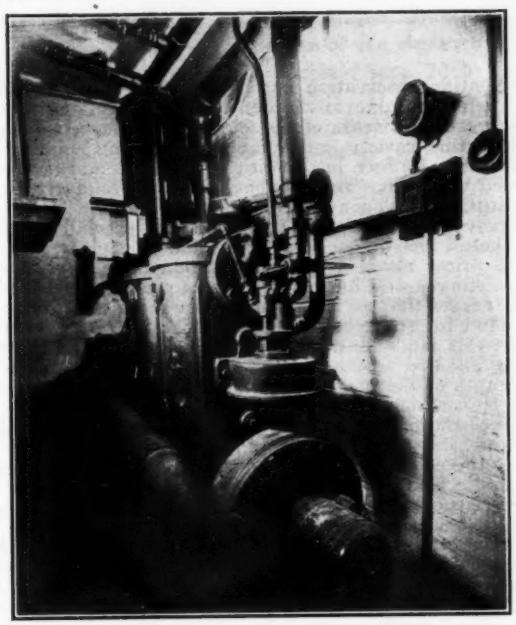
There is also in this boiler room a Cochran-Kirk " Sinuflo " gas-fired automatically controlled steam boiler, which supplies steam for the laundry and hot water, by means of a lagged calorifier, for various purposes, including shower baths and the café, a pump being provided to assist the secondary circulation.

The gas boilers for the bath warming are finished in galvanized jackets, and all are of extremely neat appearance. Indeed, a particular feature of the boiler room is the neat layout of the apparatus and the cleanliness of the plant as a whole. It may be mentioned that Messrs. S. H. Alabaster, Ltd., were responsible for the general construction work in connection with the baths, while the subcontracting heating engineers were Messrs. Donald Smith & Co.

Gas Central Heating in Barnehurst Library.

An interesting gas central heating system has been installed at the Barnehurst Branch of the Kent County Library, where the neat arrangement of the radiators can be seen in one of the accompanying photographs.

In the basement of the building has been fitted a No. A2 " Vesta " gas-fired boiler of a rated output of 161,000 B.Th.U. per hour. This boiler is automatically controlled by a thermostat on the flow pipe, being, in addition, fitted with a Venner time switch which can be set to bring the plant into operation at any predetermined time and to shut off the gas again at the end of the day. This time switch is only used during very cold weather; at other times the thermostat is hand-controlled according to the prevailing atmospheric temperature.



The "Vesta" Gas-Fired Central Heating Boiler installed at the Barnehurst Library.

In the main library, which measures 36 ft. by 22 ft. by 11 ft. high, six 9-section No. 4 Ideal " Neo-Classic " radiators are fitted in recesses set in the bookshelves, while the junior library and reading room, each 17 ft. 6 in. by 13 ft. 6 in. in size, are both equipped with two similar radiators. The office is heated with a 13-section radiator of the same pattern, and the entrance hall, measuring 11 ft. by 6 ft., with two of the new type of Ideal " Classic " wall radiator.

This installation was put into operation in October, 1934, and has given entirely satisfactory results ever since, an even temperature being maintained throughout the building—an important factor not only in consideration of the comfort of those using the library, but also in the preservation of the books in good condition.

South Suburban Cake Baking Contest

Splendid Entry for Bromley Competition

Nearly two hundred people were present at the Bromley Constitutional Club last Thursday afternoon to witness the prize-giving in connection with the sultana cake baking competition organized by the South Suburban Gas Company, to which brief reference was made in a recent issue of the " JOURNAL."

There were 118 entries, mainly from Bromley and West Wickham, though two of the prize-winners came from Orpington. The cakes were all made from a fixed recipe supplied by the Company; but the variations in sizes and shapes were rather remarkable.

The three prizes offered for the competition, which for some time previously had been displayed in the Bromley gas showroom window, were, 1st, a portable gas fire; 2nd, a gas iron; 3rd, a gas poker. So excellent, however, was the number of entries that it was decided at the last moment to add a fourth prize. The Local Manager (Mr. D. W. Evans) presented the prizes, and in the course of a few preliminary remarks he observed how pleased the Company were to see so many entries for the competition. He referred to the advantages of gas for cooking, and stated that a large number of cookers were being installed each month on their district, showing that gas was appreciated by housewives for this purpose. The prizes, he said, would be delivered to the winners the following day.

Miss F. E. Dawson, the Company's chief saleswoman and a culinary expert, judged the entries, while the organization of the competition was carried out by the Local Manager and his Assistant (Mr. P. J. Bowles), Miss Titt (Home Service Section), and Miss Lander (demonstrator). Added interest was given to the proceedings on Thursday by an interesting demonstration which preceded the prize-giving, while tea was also provided for those present.

A programme of cookery demonstrations is being arranged by the South Suburban Gas Company in this district for the coming months—at West Wickham in October; at Hayes in November; and at Chislehurst in December.

Gas Distribution Chart and Scale

We have had the opportunity of examining an interesting " Gas Distribution Chart and Scale " which has been devised by Mr. H. Mainwaring, M.C., M.I.Struct.E., A.M.C.T., for assisting gas engineers in solving problems of gas flow. Use of the chart and scale enables computation of the delivery capacity of pipes for varying values in specific gravity, coefficient of friction, diameter of pipe, length of main, and pressure loss.

Any member of the Gas Industry who desires the chart and scale should communicate with Mr. Mainwaring at " Inverleith," Oldfield Road, Bowdon, Cheshire. Copies will be supplied at the nominal charge which the costs entailed in their preparation demands.

Coke's Contribution to Sunlight

From an article contributed to the Autumn issue of *Sunlight* —the Journal of the Sunlight League—in which Mr. Nicol shows what a great part coke can play in lessening the daily smoke pall created by the domestic coal fire.

by
E. W. L. NICOL,
Technical Adviser to the London and Counties Coke Association.

Scientific observation has proved that the daily smoke pall is mainly due to the domestic coal fire. Continental visitors with a sense of humour have remarked upon the bewildering variety and number of smoking chimney-pots which may be seen in our cities and towns and have questioned the utility and economy of that peculiarly British institution, the open coal fire.

Many people are willing to burn specially-prepared smokeless fuels in their open fires and to pay the relatively high prices charged for these products, not always for altruistic reasons, but mainly for the practical and hygienic advantages that accrue. Among the more enlightened the demand for smokeless combustion is, in fact, imperative. That this laudable demand may be met and at the same time all the traditional associations and hygienic advantages of the open fire retained, at no extra cost, may not be common knowledge.

Since the introduction of gas for cooking and occasional heating and the coke boiler for continuous hot water service, there is probably no more important innovation in domestic heating equipment than the open coke fire; and there is no fuel development that has a greater potential influence upon improvement in the amenities of life and comforts of modern housing than coke and the modern appliances for its use which have been developed in recent years. But in spite of its already great popularity as a household fuel, coke is still regarded by many people with an abiding prejudice.

Until comparatively recent years coke as a domestic fuel was despised and regarded even by the poor as the last resource in fuel, and it was invariably associated with objectionable " fumes " and difficulty in ignition.

That prejudice has now been broken down and the cause of it removed. The quality of coke has been improved not only by the process of manufacture and its preparation for marketing, but also by careful selection of the coal from which it is made; and the success that has attended the efforts to improve the quality and popularize coke as a household fuel proves that any prejudice that may remain is based largely upon ignorance of its many inherent and material advantages.

Improved coke-burning appliances have at the same time been introduced. The combined flat-top coke-fired hot water and central heating boiler, designed to heat the kitchen and facilitate minor cooking operations, is now recognized in modern housing as standard kitchen equipment and has brought the inestimable boon of constant hot water and partial central heating within the reach of all, while the labour-saving gas-ignited open coke fire provides the most satisfying source of direct radiation at the minimum of cost for fuel.

Both appliances are smokeless in operation. Used in conjunction with gas for cooking and occasional heating, the coke boiler and coke fire secure and maintain that indefinable " smokeless aspect " which, with its concomitant labour-saving and cleanliness, is probably the most desirable feature of any dwelling. They add greatly to the amenities of life, both for the individual and the community, and it is true to say that with this smokeless heating equipment the ideal home, with a garden undefiled by your own and your neighbour's soot, is no longer merely an unattainable ideal. It is open to all who are so disposed to acquire and maintain that smokeless aspect, to influence others to do so, and at the same time to save money on fuel costs, labour, cleaning, and re-decoration.

The Economy of Coke.

With a maximum of convenience and economy in manufacture, service, building construction, and labour, gas provides for cooking, lighting, refrigeration, intermittent space heating, intermittent hot water supply (as in summer), drying and airing, and ventilation. Coke, as a supplementary and complementary fuel, provides for continuous hot water, central heating, refuse destruction, and continuous heating by open fires.

Both fuels are smokeless in combustion; both, in their application, provide ventilation; and although there are alternative, but unrelated, heating agents, there are the best of reasons, financial and economic—in the widest sense—why gas and gas coke should be used.

No other fuel service, supplying but a single form of fuel, can offer this attractive financial and co-operative inducement. It is probably the oldest profit-sharing service devised for the benefit of the proprietors, consumers, and co-partner workmen; and there is no better reason why householders should have complete freedom of choice as to the form of light and fuel they should use—a freedom which has been denied them by several housing authorities.

Of the yearly coal consumption in Greater London (18 million tons) about 6 million tons are rendered smokeless by carbonization at gas-works. The gas, coke, and oil fuels produced have in the past eliminated smoke emission from a very large number of domestic and factory chimneys. Every day as they supersede raw coal, these home-produced smokeless fuels contribute their quota of added sunlight by eliminating smoke. In comparatively recent years the improvement in atmospheric conditions in the Metropolis must be apparent to all.

The Ministry of Health Report (Lord Newton's Committee) on smoke abatement directs attention to the advantages of ordinary gas coke, whether used for central heating or in open grates, and recommends that " the Central Housing Authority should decline to sanction any housing scheme unless specific provision is made in the plans for the adoption of smokeless methods." For every ton of coke substituted for bituminous coal as ordinarily used in open grates, 6% or more than 1 cwt. of soot is prevented from falling on the surrounding area.

The coke boiler provides for heating the kitchen, drying, and airing. As a refuse destructor the coke boiler is effective and hygienic; combustible refuse of every description, wet or dry, is reduced to innocuous ash and clinker. The incidental saving on refuse collection and disposal must, in the aggregate, be considerable, apart from the aspect of health and hygiene.

The widely-spaced grate bars of the open coke fire not only enable the coke to burn actively and brilliantly, thus creating a strong upward draught in the chimney flue; they facilitate the removal of ash, which falls automatically through the grate, maintaining the fire in clean condition over long periods without poking, and they also eliminate " cleaning out," the previous day's cinders being allowed to remain on the grate when re-lighting the fire.

The convenience of lighting, or re-lighting, a coke fire just as and when required, by a momentary reunion with the gas from which it was separated at the gas-works, tends materially to save labour of a particularly disagreeable nature and is much appreciated.

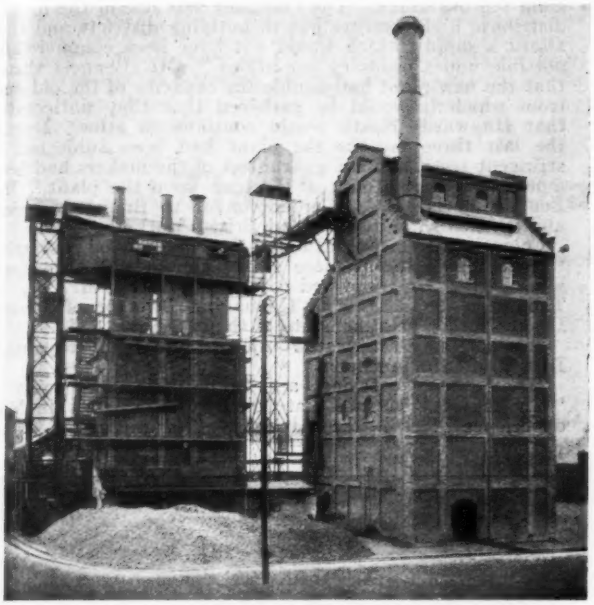
Medical Approval.

First installed in the wards of one of the London County Council Hospitals in place of existing coal fires, open coke fires were critically tested by the Medical Superintendent, who reported a very considerable saving on cost and fuel consumption and stated that the patients preferred the cheerful glow of the coke fires. Their subsequent installation, in large numbers, in the wards and offices at other hospitals, and also at the County Hall, London, sets upon the coke fire the seal of medical and official approval and finally disposes of the " coke-fumes " bogey.

Probably the greatest potential market for its smokeless fuel products, gas and coke, is the domestic fuel market, which, every year, consumes 35 to 40 million tons of coal in the raw state, with inevitable waste to the nation and untold damage to health and property.

The smokeless fuel products of a ton of coal carbonized at gas-works are approximately 10 cwt. of coke and 75 therms of gas. Economic development of the Gas Industry on an adequate scale is possible only if a balance is maintained in the demand for gas and coke. For many years the demand has been enormously out of balance in favour of gas. If every gas consumer used also his corresponding quota of coke the necessary balance would be maintained; he and his neighbours and, eventually, the whole community, would enjoy the amenities arising from a smoke-free atmosphere.

New Vertical Retort Installation at Haywards Heath



The Old Vertical Plant and Drakes' New Vertical Retort House.

A new vertical retort installation by Messrs. Drakes Ltd. was officially inaugurated at the works of the Haywards Heath District Gas Company on Wednesday, Sept. 30 by Lieut.-Col. Ralph Stephenson Clarke, T.D., D.L., M.P., in the presence of a large gathering of members of local government bodies and representatives of the Gas Industry and other public utilities.

The Haywards Heath District Gas Company was incorporated in 1865, and the original Works was subsequently built on a triangular portion of land on the west side of Mill Green Road, adjoining the main London to Brighton Railway line.

In 1890 the Lindfield Gas Company was purchased and a main laid from the Haywards Heath Gas-Works to Lindfield, and on June 24, 1890, Lindfield was supplied with gas from Haywards Heath, and the Lindfield Works closed down.

In 1916 the Balcombe Petrol Gas Company was taken over. Balcombe is a village which lies 4½ miles north-west of Haywards Heath. About this time a high-pressure plant was installed at the Haywards Heath Works, and Balcombe was supplied with coal gas through a 2-in. butt-welded steel main, governed down and supplied through the existing low-pressure mains. The building previously used for the manufacture of petrol gas was converted into a governor house and workshop.

The Cuckfield Gas Company was taken over in January, 1925. A 3-in. high-pressure main was laid between the two works, and on June 1, 1925, Cuckfield was supplied with gas from Haywards Heath and the Cuckfield works closed down, the gas being fed direct into the existing holders from the high-pressure main.

The village of Scaynes Hill, which lies three miles east of Haywards Heath, was connected by a 2-in. high-pressure main in 1916. In 1923 Ardingly, situated four miles north-east of Haywards Heath, was connected to the high-pressure system. Gas is now supplied to Ardingly College in large quantities for cooking and heating purposes, &c. Handcross is a village on the main London to Brighton road, lying seven miles north-west of Haywards Heath, and was also added to the high-pressure system in 1930.

In each of these three villages service governors are used.

Makes of Gas.

Year.	Make.	Year.	Make.
1880	5 million cu.ft.	1915	58 million cu.ft.
1895	14 ,, ,,	1920	65 ,, ,,
1900	24 ,, ,,	1925	105 ,, ,,
1905	35 ,, ,,	1930	138 ,, ,,
1910	44 ,, ,,	1935	145 ,, ,,

On Jan. 31, 1935, Mr. Alec. E. Whitcher, M.I.Mech.E., then Engineer and General Manager, submitted a report to the Directors regarding the condition of the existing carbonizing plant, and it was decided to discard this, and to erect a new continuous vertical installation.

After careful investigation and inspection of several types of plants, it was decided to let the contract to Messrs. Drakes, Ltd., of Halifax. Messrs. Drakes, Ltd., commenced work on May 27, 1935, and gas-making was commenced on the new vertical retorts on Jan. 8, 1936, the old plant being closed down on the same day. The contractors have carried out the work in a capable manner, and without a hitch of any kind. They have spared no pains to make the installation one of the best of its kind, and completed the whole of the work within the time specified.

The plant is giving entire satisfaction, and under normal working conditions the results have exceeded the guarantees.

Retort House.

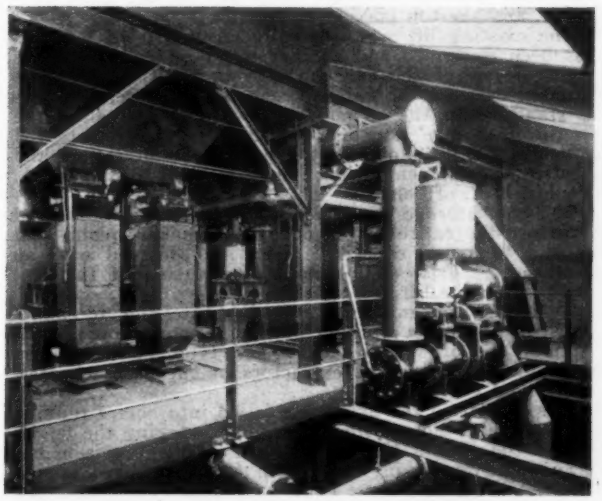
The site on which the Drakes vertical installation has been erected is adjoining the existing retort house, and is built on piled foundations. It is a steel-framed construction, the panels being built in with 4½-in. multi-coloured bricks and the steel work is also covered with 4½-in. multi-coloured bricks all set in cement mortar. Steel cased windows are built into the walls in positions to ensure sufficient lighting and ventilation in the retort house.

The retort house roof is covered with " Everite " corrugated asbestos sheets, with the exception of a large area of the side bays, which are covered with patent glazing.

The carbonizing plant comprises two settings of Drakes patent continuous vertical retorts, draughted on their new system of upward heating. Each setting contains four retorts, in units of two, each chamber being provided with an independent gas and air supply with dampers and regulators grouped in the most convenient and accessible positions, which permit of the setting temperatures being easily regulated to suit the varying throughput to meet the seasonable demands for gas.

Each retort has a guaranteed throughput of five tons of coal per diem.

The retorts are Drakes 54 model and are constructed throughout the entire heating zone of Meltham toughened silica material, the combustion chambers and settings linings being of same quality material. All the walls are insulated with Moler non-conducting bricks, and sight boxes are arranged in the front walls at frequent intervals



General View of the Charging Stage.

to permit of proper inspection of the temperatures throughout the length of the retorts. The producers are arranged on the ground floor at the front of the settings, and are of ample capacity and fitted with Drakes step-grates of large area. These grates may easily be adapted for breeze-burning if desired.

The waste-gas flues leaving the settings are prepared so that a waste-heat boiler may be fixed at some future time.

The whole of the firebrick material used in the construction of the producers and settings is of the highest quality, and supplied by Messrs. John Morton & Co., of Thornton, near Bradford.

The whole of the setting and producer structure is of a substantial nature, and arranged to permit of expansion of the brickwork without placing undue stress on any member. The plant is surrounded by spacious platforms arranged at convenient heights for inspection purposes, access being by easily graduated staircases. The coke chambers and extractors are of Drakes standard design, the discharging doors being of the self-sealing pattern.

The throughput of each retort is separately controlled by a ratchet and mask device. Superheated steam is admitted into each retort through a specially fitted nickel bush device.

Top Mountings.

The top end of the retort is surmounted by a cast-iron mouthpiece to which is attached the coal feeding hopper and the gas off-take pipe, and fitted with a filling door of ample size, each gas off-take being fitted with an adjustable gas-tight valve.

The collecting mains are arranged on the top of the settings and receive the gas from each section, each being provided with drain pipe for dealing with and separating the tar and liquor. The gas collecting main is connected to the foul main by means of a vertical pipe fitted with inspection window, and sprays for washing and cooling the gas, the liquor being continuously circulated by means of a "Cornish" direct acting steam pump. A duplicate pump is provided as stand-by.

The governing of the gas emanating from the retorts is accomplished by means of a 10-in. Braddock patent retort house governor, all valves being easily accessible from the charging platform.

Working in conjunction with the governor there is a Simmance patent "Dead Beat" twin recorder, having a range of 3 in. vacuum to 3 in. pressure on the inlet to governor and 0 in. to 6 in. vacuum at the outlet.

A notable feature is the charging platform, which is exceedingly spacious, efficiently lighted and remarkably cool, permitting the men to carry out their duties in an atmosphere of comfort.

Handling Plant.

The coal is received from road vehicles into a receiving hopper built inside a concrete tank. The coal is fed from the receiving hopper into a Drakes improved continuous gravity bucket conveyor. The conveyor is provided to deal with both coal and coke, and entirely encircles the carbonizing plant. The driving medium is a Lancashire dynamo and Crypto totally enclosed gas-works type 5-h.p. motor. The current for the motor is taken from the town supply. There are spacious platforms surrounding the coal hoppers, which provide ample and accessible accommodation when repairs are necessary to the G.B. conveyor, and the top portion of the lift.

The existing lift was originally steam-driven, but this has been electrified and another tower added to suit the higher levels of the new carbonizing plant. The lift is situated between the old and new retort house, and acts as stand-by for the purpose of elevating the coal to the overhead storage hoppers and coke to the retort feed hopper. The lift is of 20 cwt. capacity, the alterations and electrical equipment being supplied by Messrs. E. A. Foulds, Ltd., of Colne.

The coal storage hoppers are carried on a substantial structure the entire length of the carbonizing plant, and have a 48 hours' capacity. They are provided with an overhead gangway and rails for traversing of the coal bogies from the lift.

The extractor engines are in duplicate and accommodated in a suitable building inside the retort house. The engines are of Waller's exhauster type, steam driven, each 5-h.p., driving the extractors by means of countershafts and gearing.

The coke from the extractors is fed into bogies running on rails, turn-tables being provided for taking the bogies out of the side of the house to the yard. Provision has been made for taking coke from the retort feed hopper through the retort house gable to a future coke screening and storage plant.

THE INAUGURATION CEREMONY.

Mr. W. H. BENNETT (Chairman of Directors) presided at the inauguration ceremony. "We do not want to be egoists," he observed, "but we claim that the Haywards Heath Company have kept in the van of progress right from the beginning. The Company was one of the first to distribute high-pressure gas to outlying districts and thus afford a supply which would not have been commercially possible under ordinary conditions." Mr. Bennett stated that the new plant had double the capacity of the old one, from which it would be gathered that they anticipated that Haywards Heath would continue to grow. During the last three months the plant had been subjected to stringent tests, and the guarantees of the makers had been more than carried out. "We look upon the plant," Mr. Bennett declared, "as a monument to British technical ability, British materials, and British workmanship."

Colonel CLARKE congratulated the Company on possessing "such a magnificent piece of machinery." He was presented with an inscribed silver salver by Mr. M. T. Thompson, M.Inst.Gas E. (Managing Director of Messrs. Drakes, Ltd.), as a memento of the occasion.

The company afterwards adjourned to the Perrymount Restaurant for luncheon.

Mr. BENNETT presided, and in proposing the toast of "The Guests," he said that Colonel Clarke had a life-long experience of coal—the management of mines, the transport of coal, and its marketing—and if he could do anything which would help to obviate friction in the industry, increase the prosperity of those engaged in it, and ensure coal at a reasonable price to gas undertakings, then he (the speaker) was sure the result of the election which had returned Colonel Clarke to Parliament was justified. Welcoming the representatives of electricity undertakings, Mr. Bennett said: "We are both progressing, and progressing rapidly, not by taking one another's customers, but by educating the public to a higher standard of living, teaching them how to get rid of dirt, drudgery, and smoke, and have a little more leisure."

Lieut.-Col. Stephenson Clarke sets in motion the new plant under the guidance of Messrs. W. H. Bennett and A. E. Whitcher.

After Colonel STEPHENSON CLARKE and Mr. H. EDGAR GERMAN (Vice-Chairman of the Cuckfield U.D.C.) had replied for the guests, the contractors were toasted by Mr. ALEC F. WHITCHER, M.I.Mech.E. (Managing Director of the Gas Company). He said the plant was a monument to the progress of Drakes, and he paid warm tribute to the manner in which they had carried out the work. They were not, he said, out to break records, but he thought that, if they cared to push the plant they could certainly do so. In conclusion, Mr. Whitcher gratefully acknowledged the great assistance he had received from his Assistant Engineer, Mr. S. H. Cox, and from Messrs. Bedloe and Robertshaw, of Drakes, Ltd.

Mr. M. T. THOMPSON, replying on behalf of his Company and himself, said how particularly pleased they had been

at this opportunity of introducing in the South another of their installations. He could vouch from personal knowledge for the very full investigations which Mr. Whitcher had made on Drakes' installations before coming to his final decision, and needless to say they, as a firm, were highly appreciative of such thorough enquiry. He believed he could safely say that the Gas Company were satisfied with their choice, and he had Mr. Whitcher's permission to divulge that on the three months' run the plant had produced 99·8 therms per ton, worked entirely by the Gas Company's own staff, and for four weeks using only stock coals. He could not help congratulating Mr. Whitcher upon the cleanliness not only of the plant, but of the whole works, because, in his opinion, cleanliness in such cases was a sure indication of efficiency.

The proceedings terminated with the proposal by Mr. J. R. W. ALEXANDER, M.A., LL.B., of the health of the Directors of the Haywards Heath and District Gas Company, for which thanks were returned by the Vice-Chairman, Mr. W. LEES STENNING, M.B.E., J.P.

The Smoke Abatement Exhibition

The visitor to this exhibition could hardly fail to appreciate that through the universal adoption of gas and coke lies the rational and economical road to the abatement and eventual abolition of the smoke nuisance.

The smoke problem, which has existed in this country since coal first began to be used, and which led to " smoke abatement " measures as far back as 1306, is, as is commonly known, due to the difficulty of securing the complete combustion of coal. The solution of the problem depends upon the application of scientific and technical knowledge in operations in which coal is used in the raw state, or in developing through scientific research, methods for the treatment of coal to transform it, including the constituents which might otherwise have been wasted in the form of smoke, into new and smokeless forms of fuel and other products of value. Notable examples of these transformation processes are the gas and coking industries. It is appropriate that the Smoke Abatement Exhibition should be held at the Science Museum.

The Exhibition was opened by the Minister of Health, the Rt. Hon. Sir Kingsley Wood, M.P., on Thursday, Oct. 1, and will remain open to the public, free of charge, until Oct. 31. The National Smoke Abatement Society (by kind permission of the Director of the Museum, Colonel E. E. B. Mackintosh, D.S.O.) arranged the Exhibition in co-operation with the interested Government Departments and industrial associations, including the British Gas Federation and the London and Counties Coke Association. The smoke abatement activities of the Gas Industry, which must surely be ranked among the most successful, were worthily represented by the B.G.F. and the London and Counties Coke Association who arranged a truly comprehensive stand. The organizers, realizing that the majority of visitors to the Science Museum are of the " I-must-see-how-it-works " variety, provided many exhibits which were brought into operation by switches or taps. This consideration was enjoyed to the full by the visitors to the Exhibition, and it must be no small source of satisfaction to the organizers to observe how their exhibits were a real attraction, which must have brought home to all that through the universal adoption of gas and coke lies the road to clearer skies and healthier citizens.

A Smokeless House.

The exhibits loaned by the B.G.F. included a model house which shows how the Gas Industry would put a completely smokeless installation in a £2,000 house. The main warming of the house is by coke central heating which will effectively keep the temperature constant in the hall or living rooms. The heating also embraces the garage—a great boon to the motorist. Every room is fitted with a thermostat, hidden from view, which controls the warmth of the room to the required degree. For subsidiary heating and for use during the changeable spring and autumn weather, modern coloured gas fires are installed in all rooms except the lounge. Here there is a coke fire which is gas-ignited, thus saving the time and labour entailed in laying the fire with wood and paper. An all-enamel cooker and gas-operated refrigerator form part of the kitchen equipment. Hot water, of course, is immediately available at all taps from a gas storage water heater. This system also heats towel rails in the bathrooms.

The background of the stand is a diagrammatic illustration of the gas-works process. Each stage is described, and the layman should find no difficulty in following the various processes which result in the evolution of gas and its by-products. Attention is drawn to the fact that the Gas Industry has a valuable contribution to make in the reduction of smoke and corrosive substances which enter the atmosphere. Many significant figures are given. The exhibit is divided into four sections which demonstrate: The constant quality of gas and the precautions taken ensure a constant heating capacity and freedom from impurities, the control exercised during the design of an appliance to ensure that the gas is completely burnt on the one hand and that no unnecessary heat is lost with excess air on the other, the precautions taken during design to ensure that the maximum possible proportion of the available heat is made use of, and, lastly, the inherent controllability of gas.

To demonstrate the control of quality there are shown Boys's and Thomas's calorimeters. The principle of the Thomas Calorimeter is demonstrated with a special set; when a button at the front of the bench is pushed, gas of a higher calorific value feeds the flame and the galvanometer pointer is seen to take up a new position. The maintenance of pressure and the elimination of sulphur are also demonstrated by suitable apparatus.

Exhibits in the control of combustion section show how in all approved appliances complete combustion of the gas is achieved, and that in a sound appliance the gas leaving the flue is considerably freer from carbon monoxide than the air in many London streets. In the apparatus shown the gas from a flue is drawn through a purifying train and then over heated iodine pentoxide where the carbon monoxide releases the iodine which is absorbed and estimated. It is pointed out that the test is sensitive to the presence of five parts per million of carbon monoxide. Attention is also drawn to the careful tests that are carried out in the laboratories on appliances to prevent heat loss due to excess air by measuring the concentration of carbon dioxide as an indication of the degree of dilution, and, therefore, the excess of air.

Special note is made of the high thermal efficiency which is ensured by the use of gas appliances. To show how the Gas Industry measures the efficiency of its appliances such tests as the thermopile scanning a hemisphere in front of the fire are illustrated. A bowl fire is mounted so that the beam of heat can be made (by the visitor) to fall upon a thermopile suspended above it. The galvanometer deflection is a measure of the intensity of the beam at the thermopile. The efficiency of a water heater is also demonstrated in a practical manner. There is also shown a section of the same water heater, showing the thermostat for cutting down the gas supply when the tank is heated. A cooker thermostat is shown in operation with a valve to be operated by the visitor which makes the continual control of the gas rate more apparent. The working parts of another thermostat are laid open and the principle of operation is shown.

An interesting exhibit is that which demonstrates the automatic ignition of gas by the cold catalyst method. The burner is turned on and off by a time switch and the number of times this switch operates is recorded by a " Veeder " counter. It is possible for the visitor to watch the action of the catalyst, which is housed over the mantle.

Coke-Burning Appliances.

The London and Counties Coke Association lent many exhibits which showed the great part coke plays and is prepared to play in the future in the abolition of smoke. The potentialities of coke in this direction are enhanced by the fact that the traditional preference for an open grate is respected in the abolition of the vices of the hearth. Among the exhibits is an " Ideal " coke-fired gravity-feed boiler of the type suitable for hot water or low-pressure steam service. The boiler shown is the smallest of the series constructed of cast-iron in sectional design. The

efficiently proportioned flues and low loss of draught between the grate and smokehood are claimed to enable the boiler to operate with natural draught at 80% efficiency. The large number of boilers of this type now being installed for the service of works, large blocks of buildings, theatres, &c., testifies to their popularity and to the economy of heat production which they allow.

The " Cerac " automatic burner is of the type used for application to any ordinary hand-fired boiler for central heating or hot-water service, and converts the system into an automatically controlled installation, eliminating all attendance other than filling a hopper and the removal of clinker, an operation stated to require but a few minutes each day. The burner depends upon gravity feeding of the fuel from a hopper provided as part of the machine. There are no moving parts of any kind excepting a fan, which provides the air for combustion divided into primary and secondary ports. A feature of the design is the provision for the fusion of ash into clinker; so that all the ash may be removed in one piece easily and quickly, no fire bars are fitted. An economy of 30% in fuel costs with an almost entire elimination of labour is claimed by the makers with smokeless combustion at all times.

An illuminated panel shows the sectional design and construction of steel fabricated boilers of a type now built by Messrs. Hartley & Sugden, of Halifax, in sizes up to 2 million B.Th.U. per hour. This exhibit well illustrates the gravity-feed principle of fuel feeding from a hopper built integrally with the boiler and feeding fuel at the same rate as it is consumed. The absence of moving parts and the simplicity of construction are notable, the unit depending solely upon natural draught and well-designed gas passages for its operation. Long periods of operation at high efficiency and without attention are claimed for this design. Control is automatically arranged by thermostats in any desired combination.

An interesting exhibit is the model of the horizontal reciprocating type of coke screen by Messrs. Corts. This type we understand is frequently used in modern coke plants. The model is operative and finely divided coal is used in place of coke to show the segregating action of the screen.

Coke samples are exhibited of the four standard sizes normally marketed in the South of England. The ignition temperature of coke is demonstrated in a small electric furnace into which coke is placed and air passed through at a uniform rate of 0·02 cu.ft. per minute. There is also shown a bomb calorimeter for the determination of the calorific value of coke, and the C.A.B. test for determining the critical air blast.

Popular for hot water service in the home is the domestic boiler No. 0 by Messrs. Crane, of Ipswich, which has been approved by the London and Counties Coke Association. It has a rated output of 20,000 B.Th.U. per hour and is claimed to be capable of a 60% overload for quick service of hot water. Coke boilers of this type are being installed in new houses at the rate of 200,000 a year, each having a potential coke consumption of three tons per annum. Ignition is by a fitted gas burner or poker.

Popularity of the Coke Grate.

Also exhibited is a " Metro " coke grate. The popularity of the coke-burning fire is evidenced by the fact that over 70,000 per annum are being supplied in the London area alone. Another exhibit shows the method employed by the Gas Light and Coke Company for the determination of the volatile content in coke. The science of remote and automatic heat control for central heating has made considerable headway, and an exhibit, consisting of a panel mounting typical equipment for the automatic control of heating systems, boilers, and calorifiers, is arranged so that visitors can work the model by a switch.

For the scientific investigation of the smoke problem methods for the measurement of smoke are required, and an exhibit of the Fuel Research Station is concerned with current researches on this subject, which are being carried out with a view to developing a domestic fire that will burn coal smokelessly. The Department of Scientific and Industrial Research shows exhibits on the nature and causes of smoke, and on the important investigation of atmospheric pollution, which is being carried out with the co-operation of local authorities throughout the country. The various instruments used in this investigation, such as the deposit gauge, the automatic air filter, sulphur dioxide measurement apparatus, and light measurement apparatus, are exhibited.

Gas Undertakings' Results

Blackpool.

The annual report on the working of the Blackpool Gas Department for the year ended March 31, 1936, states that the gross profit is £35,140, and the net profit £10,998. The balance of the appropriation account at March 31, 1935, was £26,340, out of which has been spent the sum of £6,978, leaving a net amount in this fund of £19,362, which together with the net profit of £10,998, gives a balance of £30,360. Of this amount it is proposed to carry forward to the next year's accounts the balance of £12,727. The average price received for all gas sold amounted to 6·42d. per therm net, which is equivalent to 2s. 4·91d. per 1,000 cu.ft. The revenue from coke has increased by £3,279 due to the increased quantity of coal carbonized. An increase of £1,119 in the revenue from tar is due mainly to the increased tonnage sold and a slight increase in the price received per ton. The revenue from benzole and naphtha increased by £1,345 by the sale of increased quantities. The year 1935-36 was the first complete year in which the Department marketed these products. There has been an increase in the gas sold of 32,799,600 cu.ft., equal to an increase of 2·46%. At March 31, 1936, there was a total of 39,497 consumers; 20,767 of these are supplied with ordinary meters and 18,730 are provided with prepayment meters. During the year 1,929 new consumers have been connected. The average consumption per consumer was 33,725 cu.ft., the average consumption through ordinary meters being 45,166 cu.ft., and the average consumption through prepayment meters being 21,040 cu.ft. The number of street lamps within the borough is now 5,605, and accounts for 106,795,700 cu.ft. of gas used. 333 new lamps have been erected. The business conducted through the showroom has been satisfactory and apparatus to the value of £31,297 has been sold: 1,872 cookers, 301 fires, and 696 other appliances.

Colonial Gas Association, Ltd.

The report of the Directors of the Colonial Gas Association, Ltd., respecting the operations during the year ended June 30, 1936, states that after providing for depreciation, &c., the balance at credit of revenue account is £106,852. Adding the balance brought forward from last year—viz., £24,890, and deducting bank, loan and debenture interest, and after payment of interim dividend of 4% and 3% for the half-year ended Dec. 31, 1935, paid in April last on the preference and ordinary shares respectively, the amount at credit of the net revenue account is £62,004. The Directors recommend as follows: A dividend at the rate of 8% per annum (less interim dividend of 4% for the half-year ended Dec. 31, 1935) on the preference shares, and a dividend at the rate of 6% per annum (less interim dividend of 3% for the half-year ended Dec. 31, 1935) be paid on the ordinary shares; that the sum of £3,500 be transferred to the credit of the reserve fund; and that the balance, approximately £25,338, be carried forward to the next account. The sales of gas for the Association's works show an increase of 3·5% on the sales for the preceding year, and those for the subsidiary companies an increase of 3·9%. An offer was made in November last to the existing shareholders of 115,066 ordinary shares of £1 each at the price per share of 20s. in England or 25s. in Australia, which issue was over-subscribed. The oversubscription on 5s. per share on the Australian allotment has been credited to the 1935 share issue exchange reserve. The Directors have come to the conclusion it would be to the advantage of the Association and to the improvement and attractiveness of the Association's debentures if all issues of the Association's debentures, both present and future, were to be under a trust deed. A trust deed was, therefore, executed on June 11 last between the Colonial Gas Association of the one part and the Westminster Bank and the English Scottish and Australian Bank of the other part, these banks having agreed to act as trustees for the debenture holders. Steps will be taken at an early date to substitute the present debentures for debentures under the trust deed. A resolution will be submitted to the annual general meeting to increase the authorized capital of the Association by the creation of 50,000 additional preference shares and 100,000 additional ordinary shares, both of £1 each.

Elgin.

The annual report of the Engineer and Manager of the Elgin Gas Department, Mr. Peter Low, shows that the gas made was 122,142,000 cu.ft., an increase over last year of 9,573,300 cu.ft. The undertaking has now shown an increase of 67,463,200 cu.ft. during the past ten years. The gross profit was £3,559 and the net credit balance stands at £3,692. After considering the estimates for 1936-37 the Council decided to retain the existing price of gas.

Modern Gas Street Lighting Installations

From a Paper by W. J. G. Davey and A. R. McGibbon which was presented, on behalf of the Lighting Section of the Society of British Gas Industries, at the Annual Conference of the Association of Public Lighting Engineers at Cheltenham on Sept. 9.

The British Standard Specification for Street Lighting, No. 307, 1931, is still the official guide to street lighting and, until its revision, should be accepted in the formulation of lighting schemes, and with it the criterion of minimum illumination. Should other criteria be adopted and alterations be made to the B.S. Specification, low pressure gas, as well as other illuminants, will be able to give a good account of itself as a street lighting medium, conformable to altered conditions, but as the B.S. Specification of 1931 still holds, the installations described and illustrated in this Paper are referred back to it.

The recommendations of the Departmental Committee on Street Lighting of the Ministry of Transport, whose Interim Report was published in September of last year, should be regarded as an amplification of one class of the B.S. Specification. Thus, in the Suggested British Standard Highway Installation Classes for Roads of Different Types, suggested by Mr. Harold Davies and Mr. W. J. Jones, which are probably well known to all public lighting engineers, Class E is recommended for Secondary Traffic routes in large towns, and Class F for Main Suburban Roads with through traffic.* A modified form of this table, for medium-sized and small towns, has been recommended by one of the authors,† and is produced in Table 1.

TABLE 1.—*B.S. Class Roads for Different Types of Streets.*
[Suitable for Medium-Sized and Small Towns.]

Type of Road.	B S. Classification.
Commercial centre	D
Shopping area	E
Arterial roads	F
Residential roads—	
(*a*) With through traffic	G
(*b*) Without through traffic	H

The summarized conclusions of the Departmental Committee include the following: "(5) For traffic routes the minimum standard of lighting should be that which enables drivers to proceed with safety at 30 miles per hour without the use of head-lights; on such routes the lighting units should be of at least the number and power of those required for a generously planned Class F of the British Standard Specification. (Paragraph 21.) (9) In general a mounting height of 25 ft., with 6 ft. overhang, is desirable. (Paragraph 23.) [10] The positioning of lamps should be studied with a view to securing the best visibility, rather than uniform spacing, but normally the distance between lamps should not exceed 150 ft. (paragraph 24)."

A mounting height of 25 ft., and spacing height ratio of 150/25 = 6 are not incompatible with the B.S. Specification for a Class F or Class E road (see Table 2).

TABLE 2.—*Summarized Table of British Standard Specification, No. 307, 1931.*

Class	Minimum Rated Mean Test-Point Illumination Foot-Candles.	Mounting Height.		Spacing Height Ratio.	
		Minimum Feet.	Recommended Feet.	Maximum.	Recommended not more than—
A	2·0 & upwards	30	30	5	3
B	1·0	25	27·5	6	4
C	0·5	21	25	8	5
D	0·2	18	21	9	6
E	0·1	15	18	10	7
F	0·05	13	15	12	8
G	0·02	13	13	12	10
H	0·01	Preferably 13	13	12	10

The probable result of the Interim Report may well be the increased mounting heights of units for commercial and shopping districts, and also for residential districts.

* See Appendix to Paper by F. C. Smith. "The Planning of Gas Installations to Conform with the British Standard Specification for Street Lighting," No. 307, 1931.

† Davey. "Retention of Gas for Public Lighting."

Influence of Mounting Height upon Illumination.

A short digression upon this subject may be worth while at this point. A movement in favour of greatly increased mounting height has resulted in the recommendation that 25 ft. be adopted for traffic routes, with an illumination between Class F and Class E of the British Standard Specification. The lowest recommended mounting heights for Classes E and F, B.S.S., No. 307, 1931, were 15 ft. and 18 ft. respectively.

We have certainly progressed since the old days of the 9 ft. lamp column. In case our zeal for altitude inclines us to hitch our lighting units to the stars, however, we should realize that there are limits to the improvement in illumination occasioned by raising the light source.

Speaking broadly, there are two opposing factors in operation as the height of the lamp is increased. The vertical angle from the light source to a point on the ground is decreasing, tending to increase the horizontal illumination at the point, while the actual distance from the light source to the point is increasing, with the opposite tendency to decrease the illumination.

With increasing mounting height the second effect gradually overcomes the former, until a maximum illumination is reached, after which the horizontal illumination decreases with increase in mounting height.

The limiting mounting height to give maximum illumination may be determined from the formula

$$H = D/\sqrt{2}$$

where H is the mounting height of the lamp and D the distance of the point from the lamp base. This corresponds to a vertical angle of $\tan^{-1}\sqrt{2} = 54° 42'$.

Moreover, the effect on the illumination of raising the mounting height from, say, 10 ft. to 17 ft. 6 in. is greater than the effect of increasing the mounting height by a similar amount from 17 ft. 6 in. to 25 ft. The increases in illumination are 65% in raising the lamp height from 10 ft. to 17 ft. 6 in., and 32% in raising the lamp height from 17 ft. 6 in. to 25 ft.

There are some who consider that the recommended mounting height of 25 ft. for the good Class F illumination in the Interim Report of the Departmental Committee on Street Lighting is excessive, and that 20 ft. is a reasonable height.

Without hazarding an opinion or taking sides, one might suggest that if the increased cost of installing and maintaining the 25 ft. column against the 20 ft. column is not compensated by the increase in horizontal illumination (which is relatively small compared with the increase effected by raising the mounting height from, say, 10 ft. to 15 ft.), there may be something to be said for the opinions of the 20 ft. school.

Increased mounting height is always followed by reduction in average illumination (*i.e.*, in the total flux falling upon the street surface between the lamps). The question of glare, however, should also be considered, and it is established that the glare effect is reduced as the mounting height increases.

Any increase in mounting height should be considered in relation to lamp spacings, the shorter the spacing the lower the mounting height, &c., while the vertical angle between the mid-span point and the light source should be kept above 55°. For instance, if the spacing is 60 ft. and the distance of the mid-span point 30 ft., the increase in mounting height above 21 ft. will result in a decrease in the illumination at the mid-span point ($30/\sqrt{2} = 21{\cdot}2$)

Planning of Street Lighting and the Importance of the District Diversity Factor.

The broad classification of street illumination according to the use of the street—*i.e.*, commercial and shopping areas, Classes E to A according to importance, arterial roads, Classes F and E, and residential roads, Classes H and G, should not be followed blindly in the planning of street lighting. This might result in a Class H street opening into a Class A thoroughfare. Anyone turning into the side street would then find the darkness intensified, through his eyes being attuned to the brilliant Class A

lighting, while one turning into the main road would experience that blindness which accompanies a rapid change from darkness to light. It may well be that many night-time accidents could be traced to this dangerous diversity of lighting. There are towns which boast a brilliantly lit main thoroughfare—a show piece—with a degree of illumination out of all proportion to that of the neighbouring streets. The temptation to show what a particular illuminant can do is often responsible for this state of affairs.

The illumination of neighbouring streets should be improved proportionately so that the illumination gradually falls off as one leaves this main lighting scheme, the question of diversity in illumination between neighbouring streets, or what may be termed the "district diversity factor" being as important, if not more important, than the diversity of illumination in a particular street.

Methods of Reducing District Diversity Factor.

It will be recalled that the Ministry of Transport Report states that "there should be easy gradation from the standard of lighting adopted for traffic routes to that obtaining in side streets, and at the junction between lighted and unlighted portions of traffic routes (paragraph 27)." (See Section 14 of Summary of Conclusions.)

A scheme initiated by the Surveyor of the Borough of Wandsworth is simple, yet understood to be very effective in providing this gradation. Where possible the main road lamps are placed at the junction of the main roads and side streets; the first lamp in the side street is then placed

Fig. 1.

at 70 ft. from this lamp, while the second is at 100 ft., and the third at 150 ft.—*i.e.*, the normal spacing.

An alternative scheme adopted by the Public Lighting Department of the Bournemouth Gas Company allows this gradation with constant spacing by gradually increasing the power of the lamps in the side street, as the main road is approached.

The gradation of illumination should take into account not only the purpose of a street, but also the locality. It would perhaps be going too far to suggest that the improvement of street lighting should commence with the poorest lit streets and end with the better lit thoroughfares, but the improved lighting of the latter should certainly proceed step by step with the improved lighting of the less important streets.

The Form of Presentation of Street Lighting Installations.

The choice of the form of illustration of street lighting installations presents some difficulty. Until the photographic representation of street lighting is standardized, and attempts have been made to devise a method which will make street photographs representative of the illumination, and a reasonably accurate portrayal of what the eye actually sees* night time photographs are bound to fall under the suspicion that they are the exception to the rule that "the camera never lies." One need not go to the extremes of one prominent member of this assembly who stigmatizes such photographs as "Ananias' visiting cards," but with recollections of Messrs. F. C. Smith and K. F. Sawyer's Paper and slides at the London meeting of the Association last year, when the possibilities of photographic faking were demonstrated, one is apt to look askance at night-time photographs, "charming but to deceive," and to regard their veracity as inversely proportional to their brilliance.

Road surface brightness diagrams form a true enough graphical representation of the appearance of the street under certain well-defined and severely limited conditions, but these are not universally applicable.

Variations due to atmospheric conditions can immediately change the brightness of the road surface. A shower of rain or even summer dew will produce marked changes. Moreover, a renewal of surface dressing may cause pronounced changes.

The iso-foot-candle diagram possesses the virtue that it is typical for a given arrangement of lighting units, and is dependent only upon the light characteristics and spatial arrangements of the units. It is a basis from which other quantities can be determined, and its preparation is neither difficult nor tedious by such methods as that of Messrs. F. C. Smith and K. F. Sawyer,† or the method devised by one of the Authors.‡ The iso-foot-candle diagram has therefore been adopted for the illustration of this Paper, together with certain night-time photographs which are presented with the proviso that they are not necessarily immune from the general criticism of such photographs levelled in a previous paragraph.

The best way to assess a lighting installation is, after all, to inspect it and to judge the visibility first-hand.

Modern Gas Lighting Installations Classified According to the Type of Lighting Unit Employed.

Gas street lighting units may be broadly classified as follows:

(1) Square lamps, with and without directional reflectors.
(2) Globe type lamps, with and without directional reflectors.
(3) Lamps employing special mantles—*e.g.*, the "Supervia."
(4) Special directive fittings—*e.g.*, the "London" and "Maxill" lamps.

Square Lamps.

Square lamps are in general use for residential streets and for some arterial roads, being suitable for classes II, G, and F of the British Standard Specification. The lamps may house cluster or alignment burners, and are generally fitted with some form of directional reflector.

The reflective devices themselves form a means of classifying such lamps. Table 3 represents a classification of directive fittings according to their effectiveness in street lighting, which increases as one proceeds from Class (*a*) to Class (*d*).

TABLE 3.—*Classification of Reflectors for Square Lamps*

(*a*) No directional reflectors.
(*b*) Directional top reflectors—
(1) Stainless steel flat top with wings.
(2) Stainless steel curved top.
(*c*) Under-mantle reflectors—
(1) Multi-ray mirror-glass.
(2) Mor-lite stainless steel.
(*d*) Combination of (*b*) and (*c*), *e.g.*, (*b*.1) + (*c*.1) (*b*.2) + (*c* 2)

A further classification, Table 4, brings together lamps irrespective of the number or type of mantles, but in

* Hopkinson "Photographic Representation of Street Lighting Installations," Vol. I., No. 2, Trans. I.E.S.

† F. C. Smith and K. F. Sawyer. "Modern Views on Street Lighting and Their Relation to Visibility," A.P.L.E. Conference, 1935.

‡ Davey. "Retention of Gas for Public Lighting."

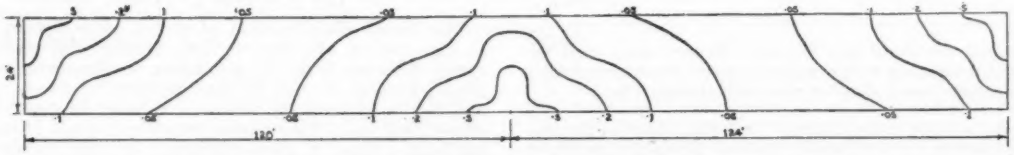


Fig. 2.—Birmingham, Fox Hollies Road Lighting Scheme. 3-light No. 2 Warwick lamp (M. & C.T.). H = 13 ft.

accordance with their lighting effectiveness. The maximum spacings to give a minimum illumination equal to that required by Classes H, G, and F of the B.S. Specification, have been calculated, and are shown in Table 5.

TABLE 4.—*Classification of Square Lamps According to Lighting Effectiveness.*

—	No. 1 Mantles			No. 2 Mantles.		
No. of Mantles - Gas rate, therms per hour	2 0·017	3 0·026	4 0·035	2 0·025	3 0·037	4 0·050
Lamp Class.	Reflector Classification.					
I.	(*c*)	(*a*)	..	(*a*)	..	..
II.	(*d*)	(*b*)	(*a*)	(*b*)	(*a*)	..
III	..	(*c*)	(*b*)	(*c*)	(*b*)	(*a*)
IV.	..	(*d*)	(*c*)	(*d*)	(*c*)	(*b*)
V.	..	..	(*d*)	..	(*d*)	(*c*)
VI.	..	..	..	..	..	(*d*)

TABLE 5 —*Maximum Spacings for Staggered Systems to Obtain Classes H, G, and F of the British Standard Specification, No.* 307 1931.

Mounting height in feet	11			13			15			18		
Road width in feet	20	30	40	20	30	40	20	30	40	20	30	40
Lamp Class.	Maximum Spacings for Minimum Illumination of 0·01 f c. (ft.)											
I.	..	120	110	155	130	120	160	135	125	170	140	130
II.	..	..	130	..	145	140	170	150	145	175	165	160
III	..	..	..	..	..	155	180	170	160	..	180	170
	Maximum Spacings for Minimum Illumination of 0·02 f.c. (ft)											
I.	..	..	..	110	..	..	115	..	..	120	105	95
II.	..	..	..	120	115	05	125	120	110	135	125	120
III.	..	..	..	135	125	120	140	130	125	150	135	130
IV.	..	..	..	150	145	130	160	150	140	165	160	150
V.	..	..	..	155	150	140	165	155	150	175	165	160
VI.	..	..	..	..	..	..	..	..	180	195	195	190
	Maximum Spacings for Minimum Illumination of 0·05 f.c. (ft.)											
III.	..	..	..	..	..	..	95	..	..	100	95	..
IV.	..	..	..	110	95	..	115	105	..	120	110	95
V.	..	..	..	115	105	..	120	110	95	125	115	105
VI.	..	..	..	130	125	115	135	130	120	145	14	135

Let us take, for example, a street 30 ft. in width, with staggered spacings of 140 ft. The present mounting height is 11 ft., and the lighting unit consists of a square lamp fitted with a 3-light alignment burner (No. 1 mantles) and no directional reflector.

From Table 3 it is found that the reflector class is (*a*), and from Table 4 that the lamp comes within Class I. In order to bring the installation within the B.S. Specification at all, it is first necessary to increase the mounting height to 13 ft., as the mounting height ratio of 12:1 allows only 132 ft. spacings for a mounting height of 11 ft., as against 156 ft. for a mounting height of 13 ft.

An examination of Table 5, however, shows that it will be necessary to raise the mounting height to 18 ft., in order to secure a minimum illumination of 0·01 foot-candle to bring the installation within Class H of the B.S. Specification.

Suppose, however, we fit the combination of reflectors Class (*d*) of Table 3. The lamp now comes within Class IV. of Table 4. With a mounting height of 13 ft. (quite suitable for such a lamp), the lamps will now give a minimum illumination in excess of 0·02 foot-candle, and the installation will be Class G.

A four-light No. 2 burner lamp without directional reflectors would, at a mounting height of 13 ft., give Class H illumination with a spacing of 140 ft. and road width 30 ft. The illumination could be raised to Class F by increasing the mounting height to 18 ft. and incorporating the combination of reflectors Class (*d*), Table 3.

Installation No. 1—Birmingham (Fox Hollies Road).

Fig. 1 is a night-time photograph of an important stretch of the Outer Circle Bus Route in Birmingham. It is illuminated by means of 3-light Warwick square lamps with Mor-lite and curved top directional reflectors. The road width is 24 ft., and the mounting height of the lamps 13 ft. In these circumstances a spacing of 150 ft. would permit an illumination in excess of 0·02 foot-candle—*i.e.*, Class G of the B.S. Specification. The spacing is actually 120 ft., and the minimum illumination 0·035 foot-candle, the distribution of illumination being shown in the iso-foot-candle diagram, fig. 2.

Fig. 3.

Globe Type Lamps.

Globe type lamps, either suspended or mounted upright on U-fixings, are more generally known, perhaps, by the manufacturers' trade names—*e.g.*, the "Rochester" and "Stechford" lamps. Incorporating up to fifteen mantles, they form an imposing and efficient gas street lighting unit, and are universally employed for Classes G to D of the British Standard Specification. So great is the number and variety of reflecting and refracting devices which have been applied to improve the street lighting effectiveness of these units, that it would be difficult to classify them in the same way that square lamps have been classified.

A valuable guide to their application was given in Mr. F. C. Smith's Paper on "The Planning of Gas Installations to Conform with the British Standard Specification," 1931, and this may be studied with advantage for installations with standard globe type lamps and standard reflectors, bearing in mind, however, that advances in technique have been made since the date of that Paper, so that improved results would be shown by globe lamps fitted with the latest pattern directional reflectors.

Installation No. 2—Wandsworth.

As previously mentioned, one associates the square lamps with lower classifications, while the "globe" lamps are more commonly employed for Class "F" and upwards. A Class G installation at Wandsworth (fig. 3) employs four

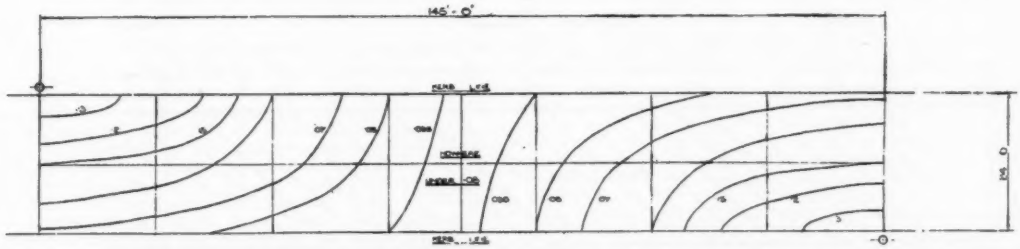


Fig. 4.—Iso-foot-candle diagram of 4 No. 1 mantles in 6-light Rochester casings fitted with Holophane band and dish refractors mounted 14 ft. 9 in. to mantles. Eglatine Road, Wandsworth.

Fig. 5.

Fig. 6.

No. 1 burners in cluster formation, in a "Rochester" lamp, fitted with Holophane band and dish refractors, mounted 14 ft. 9 in. to mantles, and spaced 145-150 ft. apart staggered. The width of the road is 24 ft. The distribution of illumination is shown in fig. 4.

Installation No. 3—Bournemouth (Poole).

This installation of 12-light "Maxill" lamps was installed on the Bournemouth Road, Poole. A night-time photograph is shown in fig. 5. The lamps were spaced at 180 ft., staggered, with a mounting height of 24 ft., the road width being 35 ft. The minimum illumination recorded by photometric tests of the installation was 0·08 foot-candle. Adjustment of the reflectors with the later pattern "Maxill" lamp would raise the minimum illumination to 0·10 foot-candle. In fact, it was the small area of lower illumination obtaining in this installation which occasioned the experiments resulting in the double-directional reflector of the new "Maxill" lamp.

Installation No. 4—Stretford.

An example of a modern Class "D" installation at Stretford is of particular interest, as the road is somewhat exceptional in design. It is understood to be one of the first roads of its kind to be constructed in the north to the requirements of the Ministry of Transport, incorporating the much discussed cycle tracks.

A staggered system of lighting was adopted, employing 12-light No. 2 size "London" lamps mounted at 22 ft. to mantles, and spaced at 120 ft.-130 ft. The overhang from the kerb is 6 ft. 3 in. The lamps stand in the centre of a 4 ft. 6 in. grass verge which separates the 30 ft. carriage way from the 9 ft. cycle tracks. A further 4 ft. 6 in. verge separates the cycle tracks from the 7 ft. 6 in. footpaths.

Fig. 6 shows by night a general view along the different routes. The footpaths are cement slabs, the cycle tracks pink coloured concrete, and the carriage way fairly large tarred granite chips presenting a non-skid dull black surface.

The flux distribution on the road surface and minimum illumination values on the footpath and cycle tracks are indicated in fig. 7, and gives an idea of the wide distribution of this lamp.

Discussion.

Mr. H. S. Adams (Engineer and Manager, Bilston Gas Company), discussing the importance of gradation of illumination from main roads into the side roads, said that at Bilston there was a gradual decrease of the degree of illumination in the side roads away from the main roads in order to avoid the sudden black-out effect when turning into side roads from the main roads. He was able to work in harmony with the Borough Surveyor, and during the last 18 months the mounting heights of all the lamps in Bilston had been increased. He was perfectly satisfied that the degree of illumination necessary under modern traffic conditions could be achieved by means of the new low-pressure gas lamps.

Mr. A. G. Higgins (Public Lighting Department, South Metropolitan Gas Company) said the Paper indicated quite clearly how the whole range of the classes in the British

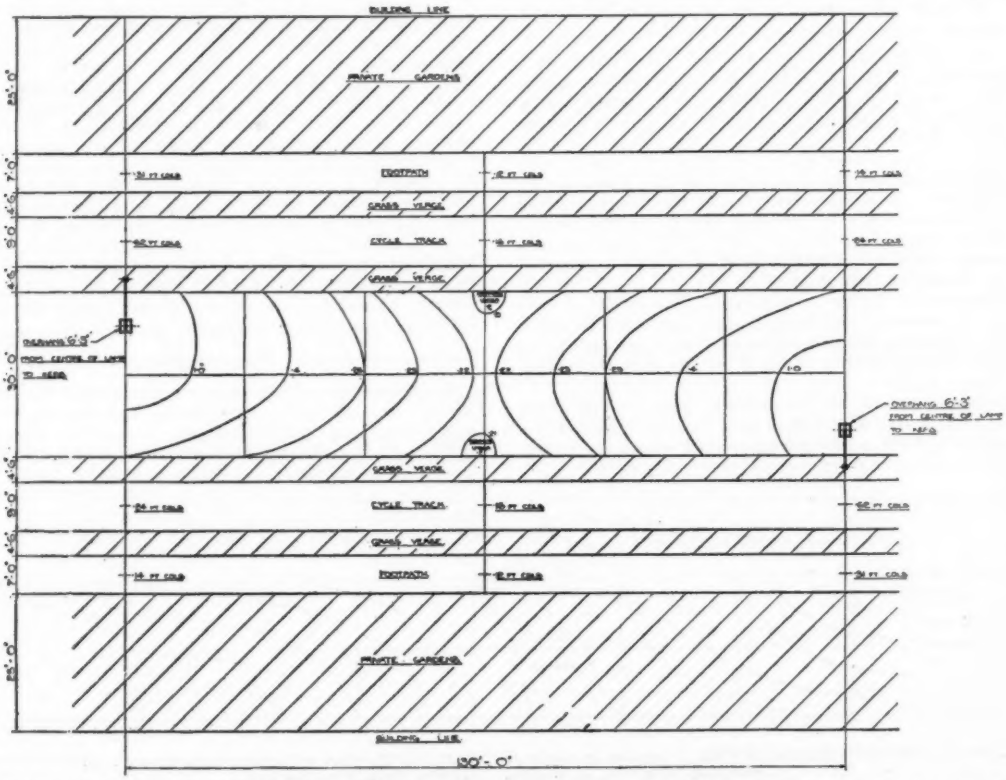


Fig. 7.—Iso-foot-candle diagram of 12-light No. 2 B/2 pattern "London" lamps mounted 22 ft. to mantles. Results of tests at Stretford.

Standard Specification could be satisfied by the use of gas equipment. Expressing a preference for refractors over reflectors as agents for distributing light, he suggested that Table 3 of the Paper, which classified reflectors for square lamps, was rather incomplete, and asked into what class the Authors would place a square lamp fitted with a refracting dish. Apparently it would be included in Class A in the Table (lamps with no directional reflectors), but, judging by the lighting that it afforded, it would easily conform to Class D (combination of directional top reflectors and under-mantle reflectors). In London his Company had erected some interesting installations with square lanterns and "South London" lanterns, employing refracting dishes and no reflectors, and the light was equally as effective as if reflectors had been used. It was surprising that the Authors had not mentioned any of the excellent installations of high-pressure gas lighting in London and the provinces, for he believed that high-pressure gas lighting would play quite an important part in the street lighting of the future, especially as there was a growing tendency to distribute gas at rather higher pressure than had been the custom in the past.

Mr. C. A. MASTERMAN (Gas Light and Coke Company) suggested that there was a certain danger in linking street accidents with lighting too definitely; quite obviously there was a relationship, but if preservation of life were regarded as the only criterion he was afraid the technique of street lighting would suffer. They had to think also of the fatigue of drivers of vehicles, and they had to think of pedestrians and of policing, so that the street lighting problem was a much more complicated problem than some people appeared to think. In some of the Papers presented to the meeting there seemed to be a suggestion that if they could find some sacred formula and apply it everywhere the whole street lighting problem would be solved at once. That was far from being the case, however. They needed some general idea of the standard, but the decision as to the position and type of lamp must be made locally, by the closest co-operation between the public lighting engineer and the suppliers of gas and electricity. The public lighting engineer was in a particularly favourable position in having two suppliers who were keenly competitive; without that competition, public lighting would possibly cost twice its present cost, given the present standard. There was also a certain danger in respect of the design of street lighting installations, for sometimes, after a quite brilliant installation had been provided, there had been an increase in the number of accidents. It was very important, when considering new installations, to avoid the optical illusion which would give drivers the idea that they could see very much further than in fact they could.

Cost of Increased Mounting Heights.

Mr. C. I. WINSTONE (Gas Light and Coke Company, Vice-President of the Association) said that the increased cost involved in increasing mounting heights from 20 to 25 ft. was approximately 10s. per column for both gas and electrical installations. He asked the Authors for a graph showing the average illuminations obtained at 21 ft. 6 in. and 25 ft. mounting heights respectively, to show the value of the increase of height. Even if there were no increase of average illumination he believed the expenditure of the 10s. would be worth while; the units had a better appearance at 25 ft. height as compared with 21 ft. 6 in., and from his personal observations it seemed that the illumination was more even.

Emphasizing the importance of the proper illumination of side streets, he said that in some cases the lighting in main roads was being increased out of all proportion to traffic needs, while the illumination in the side streets was not touched; one should not provide Class D illumination in a main road and Class H, or less, in side streets.

Iso-candle diagrams were scientific and very useful, but were only approximate, and he had never seen the results shown in such a diagram repeated exactly in the street. The South Metropolitan Gas Company had tested installations by dividing a street into 10 ft. squares and had measured the actual illumination in the street, and he regarded that as the best means of measuring the value of any installation. That could only be done, in London at any rate, after 2 a.m., in view of traffic conditions. Therefore, he suggested that every manufacturer and illumination authority, whether using electricity or gas, should have a piece of ground on which they could provide installations, easily adjustable, and actually test the degree of illumination on the ground by means of a good photometer. A man using a photometer in a street would not take very careful readings, for fear of traffic.

Mr. F. C. SMITH (Gas Light and Coke Company) said he believed that quite good service in the cause of street lighting could be done by providing a partial cut-off; recently he had had some experience of installations with a partial cut-off down to about 5° below the horizontal, in which glare effects had been minimized, if not eliminated. Illuminating engineers sometimes concentrated their attention almost completely upon the lighting of straight stretches of roadway and gave too little attention to intersections and danger spots on the roads. A great deal of attention, however, should be given to the latter places. In their keenness for uniformity it appeared that some people had read into the Interim Report of the Ministry of Transport a little more than was intended. Illuminating engineers should not go too far in the direction of uniformity but should suit the lighting to meet the characteristics of their particular towns. Cheltenham, for example, presented a very special problem. Finally, he pointed out that increase of mounting height often increased maintenance charges, for it often meant double-handed instead of single-handed maintenance.

Councillor W. COOPER (Wandsworth), commenting on the Authors' reference to the scheme at Wandsworth, said that the type of installation which involved lamp posts at the junctions of main roads and side roads had disappeared there, both for electric and gas lighting, and another scheme had been adopted as the result of consultation between the gas and electrical interests and the Borough Surveyor according to the needs of the particular thoroughfares. In roads with Class F lighting, the first lamp was placed at a distance of from 20 to 40 ft. from the main road, the second at from 80 to 100 ft., after which the normal spacing of about 150 ft. was adopted. There was a similar gradation from Class E to Class G, or from Class F to Class G roads. The whole of the 230 miles of roads had been treated in that way.

Tree Borders and Central Suspension.

Mr. J. H. CLEGG (Engineer and Manager, Gas Department, Southport) said that on 'bus routes in Southport central suspension lighting had been adopted and had met with popular favour. The Chief Constable was consulted and was definitely in favour of central suspension; it was particularly suitable in Southport, having regard to the many trees on the roadsides. Mounting height was a matter of balancing the evenness of illumination on the road with the intrinsic brilliancy of the light source; if the light sources were not detrimental to motorists and good visibility and evenness of illumination could be achieved by adopting a given height, why should it be necessary to adopt a higher mounting? It would result in higher maintenance costs and a decrease of brightness on the road. For a light source to give Class E illumination, a mounting height of from 18 to 20 ft. was satisfactory; for higher candle-power sources it was advisable to adopt higher mountings. In appealing to members of Committees to give their lighting engineers reasonable scope, Mr. Clegg urged that where a new scheme was adopted it should be one that would last for a few years and should not be regarded as temporary. Finally, he suggested that the Association might secure the interest of the Chief Constables' Association, and the Automobile Association or the Royal Automobile Club, and so obtain outside opinions on public lighting.

The Author's Reply.

Mr. DAVEY, replying to the discussion, said that manufacturers of equipment depended entirely on the lighting engineers in the preparation of schemes, and where their help was freely given, as at Bilston, they could produce good schemes. Mr. Adams was to be congratulated upon the Bilston lighting.

The question of the use of refracting devices in high-pressure gas lamps had been dealt with exhaustively in previous Papers. When Mr. Winstone had referred to the effect of mounting height on average illumination he probably had in mind minimum illumination, because it was generally recognized that average illumination decreased as mounting height was increased. The tower wagon was admirable for use in the maintenance of lamps 18 or 20 ft. high, but he would have some trepidation in utilizing the tower wagon for maintaining lamps at even 25 ft. So that an increase of height to 25 ft. would involve the expense of providing raising and lowering gear, and that would considerably exceed 10s. per column. Mr. Winstone had assured him that maintenance costs would not be increased as the result of increasing mounting height from 20 to 25 ft. according to the specifications in the Ministry of Transport Report.

Mr. MCGIBBON, who also replied to the discussion, said that many of the iso-candle diagrams in the Paper were prepared from tests actually made on the road surface during ordinary conditions and in some cases after the installations were erected. The suggestion to provide demonstration grounds for lighting was worthy of careful consideration. Unfortunately, some Councillors tended to regard a demonstration outside their own areas as something with a "catch" in it, and might say that a demonstration on a special ground was really a showroom demonstration and was not the same thing as a demonstration in their streets.

Commenting on the reference to cut-off and partial cut-off fittings, he said that Messrs. Sugg had produced a lamp with a complete cut-off a few degrees below the horizontal, so that, when one stood midway between two columns the more distant lamps were invisible, although the light reaching the road surface was ample. Unfortunately, some people did not think a lamp was good unless they could see a bright source, but they did not look at the road surface. No doubt that attitude would change at some future date, as it had on the Continent, where cut-off fittings were commonly employed.

The statement by Mr. Clegg that a mounting height of 18 or 20 ft. was admirable for a Class E installation was both correct and incorrect, for it depended on the spacing. With very wide spacing the mounting height would need to be increased, and he hoped that in future specifications lighting engineers would give attention to spacing/height ratios. They had come to think of 150 ft. spacing (as mentioned in the Ministry of Transport Report) and 25 ft. mounting height—*i.e.*, a spacing/height ratio of 6/1. With 120 ft. spacing, perhaps a mounting height of 20 ft. was admirable. If one used a very high candle-power lamp one must increase the mounting height and could at the same time increase the spacing in order to give the specified illumination.

Rationalization of Distribution of Gas in Great Britain

By GEORGE EVETTS, M.Inst.C.E., M.I.Mech.E., M.Inst.Gas E., M.Cons.E.

I.—Analysis of Undertakings and Reasons for the Large Number.

Table I gives extracts from the Board of Trade returns and other sources at the end of 1934.

There are many reasons for the large number of separate undertakings in a small country such as:

(*a*) The age of the Industry. The public supply of gas is upwards of 120 years old, and the conditions at the time of formation must be taken into account. The genesis was purely local, the capital found locally, and having regard to all conditions, localized supply was the only practical solution.

(*b*) Most undertakings are within easy reach, either by rail or sea, of suitable gas coals.

(*c*) Most localities can absorb the coke arising out of the carbonization of coal without the necessity of export.

(*d*) Economy of manufacture is not marked above a certain size. Indeed many small undertakings, owing to favourable prices for coal and coke, can manufacture as cheaply as the largest.

(*e*) Distribution problems are relatively simple in compact areas.

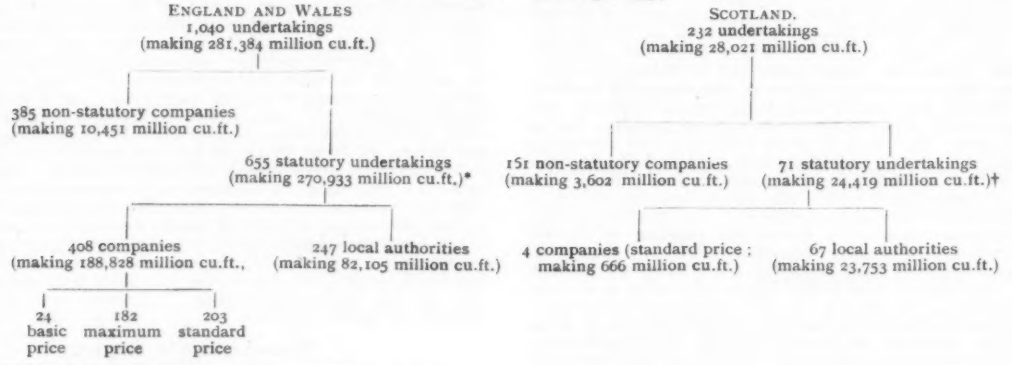
(*f*) Since the introduction of the National Bodies—*i.e.*, the National Gas Council, the British Commercial Gas Association, Industrial Centres, and so on, the smaller undertakings can have the advantages of pooled information respecting legislation, administration, manufacture, utilization, and selling organization.

(*g*) The specialized work carried out by the makers of plant and consuming equipment is available to large and small alike, and the technical and research work undertaken by The Institution of Gas Engineers is open to all members.

In many cases it is cheaper to manufacture and distribute locally than to carry gas long distances and to transport the coke from large units to the local centre of consumption.

Table II illustrates the previous statements, the figures being taken from Field's Analysis for 1934.

TABLE I.—*Gas Undertakings*, 1934.



* Excluding purchase of 15,194 million cu.ft. of coke oven gas.
† Excluding 151 million cu.ft. of gas purchased.

TABLE II.—*Costs of Gas*. 1934.

Name and Make in Million Cu.Ft.	Costs in Pence per Thousand Cu.Ft. Sold.					
	Net Carbonizing Materials.	Cost into Holder.	Distribution Cost and Administration.	Rates and Sundries.	Charge for Capital.	Total Operating Costs.
Gas Light and Coke Company (51,533)	6·22	13·31	16·19	8·04	9·72	47·26
Southgate (480) . .	11·18	24·28	11·50	9·83	8·53	54·14
Hornsey (771) . .	10·23	19·91	8·30	8·41	7·53	44·15
Coatbridge (307) .	3·47	9·59	7·36	10·83	11·50	39·28
Drighlington (65) .	9·50	22·82	12·50	10·82	10·24	56·38
Birmingham Corporation (14,810) .	7·72	14·46	5·41	5·05	5·25	30·17
Glasgow Corporation (9,412) . .	8·96	15·83	4·76	10·30	5·72	36·61
Paisley Corporation (396)	3·51	10·54	4·27	6·57	8·46	29·84

At the same time a great deal can be done in the merging of interests in some form or other, and this will be dealt with in the following section.

II.—Methods of Rationalization of Manufacture and Distribution.

Although there are many good reasons for the large number of separate undertakings, there is a great scope for rationalization in the Industry. There are numerous instances where the results are much below a good standard.

Although the reasons previously given may lead to the conclusion that the smaller undertakings should be efficient, there are many where consumers and shareholders would gain advantages through some form of rationalization.

There are many inefficient manufacturing stations and much remains to be done in the co-ordination of administration and selling policy, coupled with improvement in the service and reduction in charges.

Competition from electricity is getting more severe, due to the activities of the Central Electricity Board supported by local organizations, and this competition is most severe in the rural areas. It is increasingly difficult for the small gas undertaking to keep its place in the provision of amenities for the rural population, quite apart from its prosperity as a commercial undertaking.

The following are the methods by which rationalization in some form or other can be effected:

(*a*) *By Statutory Amalgamation or Absorption.*

Substantial progress has been made in this respect in the past 30 years. Nine undertakings alone have absorbed between 50 and 60 statutory or non-statutory undertakings in the period named, and at least ten others have absorbed another 40.

These amalgamations have been submitted to and approved by Parliament directly or through the Board of Trade. The transactions have been effected by either cash payment or exchange of stock, giving equal income (and usually enhanced capital value) to the stockholders, and is generally advantageous to consumers.

The absorbed undertakings have lost their separate identities, and the gas supply in the area concerned has been merged within the control of the larger undertaking, together with the control of gas charges, dividends, and financial provisions.

A certain amount of absorption of a similar nature has been effected by the municipal undertakings either by outright purchase of neighbours, or by the setting up of joint boards. One county council in Scotland has absorbed nine undertakings. In such cases, inefficient or redundant works have been shut down, high and low pressure pipe lines have been laid, and it may be assumed that the concentration of manufacture has been of distinct advantage.

It should be noted that in all cases of amalgamation Parliament has ensured that the resulting capitalization has not been to the detriment of the consumer. In other words, the earning capacity of the undertaking absorbed was the ruling factor in deciding the basis of transfer.

(*b*) *By Controlling Interest in Statutory Undertakings.*

Parliament has recognized that it might be to the advantage of an undertaking to obtain an interest (controlling or otherwise) in another gas undertaking, or any other undertaking carrying out processes to the advantage of the Industry. Accordingly the Gas Undertakings Act of 1932 gave statutory undertakings what is known as the "powers of investment" clause.

Several undertakings have taken advantage of this clause to invest in neighbouring undertakings. Although limited, the clauses enable bulk supplies of gas to be exchanged on terms mutually satisfactory, and the smaller undertakings get the advantage of the technical control of the parent, and selling policy can be co-ordinated.

Under this scheme each undertaking retains its separate entity as far as its legislative enactments are concerned.

A further development along these lines relates to the mutual exchange of stock, which has been effected by the South Metropolitan, South Suburban, and Commercial Gas Companies which are adjoining companies in central and suburban London.

(*c*) *By Supplies in Bulk and the Purchase of Coke Oven Gas.*

These are largely post-war developments. Authorized (*i.e.*, statutory) undertakings in 1934 purchased the following:

	Million Cu.Ft.
Gas in bulk from other authorized undertakings	938
Coke oven gas	18,194
Total	19,132

This represents over 6% of the total amount of gas made and bought by authorized undertakings.

The advantage of this form of rationalization is obvious, although it relates only to the manufacturing side, and the scope is increasing.

An undertaking may have inefficient or obsolete works, and in preference to installing new plant with corresponding capital charges, it may purchase from a neighbour. The supplying undertakings may have surplus plant owing to economy in purchasing a larger unit than is necessary at the time of installation, or a reduced demand in its own area due to movement of population or loss of large consumers. For example, when the Ford Motor Works was removed from Trafford Park, Manchester, to Dagenham, London, the Stretford Gas Board lost a consumer of a relatively large proportion of its output, and a sale in bulk would have been of distinct advantage. It was not forthcoming, however, but by intensive propaganda and the framing of suitable industrial rates, the load was more than gained from other neighbouring industries.

Although load factor may not be important in the gas as in the electrical industry, yet the scale of manufacture within the limits of the capacity of the installed plant has an important bearing on the cost of production.

The economics of an additional load in certain circumstances needs special consideration, and the cost of additional gas is usually substantially lower than the cost of the existing output. In these circumstances, the rates charged for such additional gas can be comparatively low without upsetting the rates to existing consumers.

It must not be overlooked, however, that such supplies are fundamentally different from supplies by coke ovens. Gas is still the primary product, whereas in coke ovens it is a residual product, and always will remain so. The receipts for such residual products are only of importance in so far as they affect the price of the primary product.

The value of the secondary product is assessed with regard to its alternative uses. If it can be used on the site of the oven, then its value must be compared with the alternative fuel. If it is purely a waste product, then, in theory, any price obtained represents a profit, but it must have a value in the market if there is a potential purchaser. There is usually some gas undertaking not too far distant which is willing to purchase at a low price.

However, these conflicting considerations are usually settled by a bargain made between presumably willing buyers and willing sellers.

The coke oven supplier must have regard to

(*a*) The cost of compression,
(*b*) The cost of the pipe line (if any),
(*c*) The cost of purification (if any),
(*d*) The cost of storage (either as a "balance" or against emergency), and
(*e*) The financial effect of the obligations imposed on the supply.

The buyer, in comparing the cost of coke oven gas with that manufactured in his own works, must have regard to

(*a*) The cost of the pipe line (if any) and ancillary alterations to works,
(*b*) The cost of purification (if any),
(*c*) The cost of maintaining the works other than manufacturing plant,
(*d*) The cost of maintaining manufacturing plant as a standby in the event of breakdown in the supply,
(*e*) The cost of amortization of the works rendered obsolete, or of the pipe line, and
(*f*) The financial effect of any other condition of supply.

It is essential to consider (*d*) above, because the gas undertaking has a statutory obligation to maintain the supply under penalty (apart from the commercial necessity of so doing) which the supplier will not shoulder. The public utility cannot run the same risk as suppliers of other commodities. Although during the trouble in the coal fields in 1926, the British Gas Undertakings paid as much as £7 per ton for coal all over the country, the supply of gas was maintained.

The coke oven owner is not prepared to continue the manufacture of coke through long periods of trade depression in order to maintain a supply of gas, and this fact alone has an important bearing on the price of coke oven gas.

With all the difficulties, however, considerable progress has been made, and about 33 gas undertakings are now purchasing all or part of their requirements from coke ovens. The outstanding example is Sheffield, which is geographically well situated both for the purchase and disposal of such gas.

The Government in 1929 appointed a Committee to consider the proposals for the rationalization of gas supply in the North Midlands, with particular reference to the coke oven gas disposable. The Report is known as the "Report of the Departmental Committee on Area Gas Supply" and the Sheffield gas grid is built up partially on the technical scheme envisaged in the report of the committee.

During 1935 the Sheffield Company purchased 7,099 million cu.ft. from eight ovens, and made only 149 millions, and 37 miles of the grid was laid, the maximum diameter being 24 in.

The price is 5½d. per 1,000 cu.ft. compressed but not purified, with a sliding scale based on the market price of coal. (See the Sheffield Gas Act, 1931.)

By an excellent sales organization, including a comprehensive industrial department, gas is sold to the light and heavy industries at prices ranging from 10d. to 1s. 3d. per 1,000 cu.ft. of 500 B.Th.U. gas (2d. to 3d. per therm).

The cost of distribution was calculated by the Area Supply Committee at between 0·13d. and 0·25d. per therm, so it will be seen that there is not a great margin available for the shareholders of the Sheffield Company. In fact, during the development period the dividend dropped from 6 to 5½% on the ordinary stock, but the scheme as a whole has been of great value to the industry of Sheffield, and this has been acknowledged by more than one manufacturer.

Sheffield now sells no less than 62% of its total for industrial purposes. At the same time the small domestic consumer pays the reasonable price of 6·6d. per therm.

The Sheffield Company were purchasing coke oven gas with separate branch supply pipes for some years before the comprehensive scheme was considered. The coke oven owners promoted a Bill in Parliament for the separate marketing of coke oven gas in opposition to the Sheffield Company's Bill, but a last-minute agreement was signed, and the oven owners' Bill was withdrawn.

Coke oven gas throughout the country costs the gas undertakings from 5d. to 10d. per 1,000 cu.ft. (approximately), dependent on local conditions.

A Government Committee is now sitting on a similar problem for the West of Scotland, but the geographical and economic conditions are not quite the same as at Sheffield, and the volume of gas available is very much less. Some of the smaller undertakings in this part of Scotland are putting gas into holder at about 2d. per therm.

It must not be overlooked that the capital charges on plant still have to be met when coke oven gas is purchased, such charges in part only being saved when a new plant is necessary for the gas-works.

A very large percentage of the available coke oven gas is already being purchased by favourably situated gas undertakings. There are possibilities of new, or reconstructed, ovens being erected in the near future if and when suitable contracts can be arranged for the disposal of the surplus gas. The figures given show that a great deal has been done in this desirable form of rationalization.

There have been occasional breakdowns in the supply, but the writer cannot remember any case in the last ten years when a community has been without gas due to the failure of the coke-oven supply.

There is still scope for the purchase of gas in bulk or amalgamation which could produce a similar result. It is not infrequent to see two gas-making units a few miles apart, each of which would gain by the substitution of one

larger unit. There are cases where one statutory area of supply forms an island completely surrounded by a larger undertaking, this latter having mains adjacent (and works not far away) capable of taking up the supply of the island territory.

(*d*) *Holding Companies.*

Although not new, the holding company system has been very much "in the news" during the past five years and very considerable progress has been made. The idea is not new, because the British Gas Light Company is upwards of 100 years old, and controls both statutory and non-statutory undertakings.

Table III gives the principal holding companies with the number of gas subsidiaries at the time of writing, and the approximate volume of gas sold for 1935.

TABLE III.—*List of Holding Companies.*

—	Number.	Sales in Million. Cu.Ft.
1. British Gas Light Company	36	3,342
2. South-Eastern Gas Corporation	18	5,047
3. South-Western Gas Corporation	23	882
4. Severn Valley Gas Corporation	19	1,985
5. United Kingdom Gas Corporation	10	2,446
6. Caledonian Gas Corporation (a subsidiary of No. 5)	16	477
7. Gas Consolidation	6	352
8. Associated Gas and Water Undertakings	9	834
9. South Midland Gas Corporation	3	222
10. Swindon and District Gas Corporation	6	394

No. 1, although not formed with the idea of geographical grouping, has many undertakings in local groups.
No. 2 is controlled by the Gas Light and Coke Company (London).
No. 9 is controlled by the Oxford and District Gas Company.
No. 10 is controlled by the Swindon United Gas Company.

Many of the companies were formed with the primary object of geographical grouping, but two at least (5 and 7) are somewhat wider in their scope, and are prepared to acquire purely localized groups or individual units which may in future be grouped.

Criticism has been levelled against the holding company system. Some object to the principle, others fear the abuses which might result from control by financial interests. Some misconception has arisen on account of the viewpoint. Although high prices have been paid (that is, high in relation to the par values), yet these high prices are not entirely created by the holding companies. It is true that a little more than market price must be paid for the controlling interest, but the market price is ruled by the earning capacity of the undertaking and the value of money.

Further, British conditions are not the same as those of other parts of the world. The undertakings do not lose their separate identities and are therefore still subject to statutory control. As nearly all undertakings must come to Parliament or the Board of Trade periodically for additional capital and other powers, there is always the opportunity for an official review of the stewardship of the controlling body. There is certainly room for minor abuses, but these opportunities are very limited, and up to the present the holding companies are controlled by skilled teams of financial engineering, and legal experts, many of whom have intimate knowledge of the Industry.

If the sponsors of the movment are in it to make money, as presumably they are, then the best way of increasing the profit is to broaden the basis of the business by making the consumer the first consideration, as in the case of every business aiming at continued success. Parliament will find a way of checking abuses if and when they occur.

The advantages offered by amalgamation controlling interests, or the holding company system, may be summarized as follows:

1. Skilled financial control, aided by cheap capital for development.
2. Technical advice at a relatively low cost.
3. Bulk purchase of materials, and the reduction of patterns or types of appliances.
4. Co-ordination of service policy, uniformity of methods of rate making, &c.
5. Interchange of gas in bulk when desirable, resulting in lowering of costs and the saving of capital.
6. Improvement in supply and the provision of support for the smaller undertakings.
7. Systematic planning for the future.

Numerous examples can be given of these advantages having been gained, in many cases accompanied by a reduction in price of gas.

III.—Reasons which Prevent More Active Rationalization.

Some of the reasons given for the large number of undertakings are of course equally good reasons why rationalization has not progressed more rapidly. It follows that if the results outlined in the previous section cannot be achieved, there is no object in merging or effecting an amalgamation in any form, because mere size of output or territory does not make for efficiency. In the distribution of gas and the relations with consumers, mere size may indeed be a disadvantage. At the same time a great deal can be done which is not being done for the following reasons among others:

a. The existence of municipal undertakings in close proximity to those owned by companies.
b. The difficulty in getting municipal undertakings to co-operate with other municipalities or even consider bulk supplies.
c. The lack of initiative or ability on the part of boards of directors.
d. Personal considerations.
e. The lack of appreciation of the results which can be achieved.

The existence of municipal undertakings is undoubtedly a stumbling block. The ownership by ratepayers is unavoidably interlocked with control by elected representatives, whose election depends entirely on political considerations, which, though excellent in many ways, are not a guarantee of business ability in running a public utility undertaking.

It would not be expected that a candidate for a board of directors would claim election on his ability to render public service as a town councillor. The town councillor, when chairman of a gas committee, cannot always make the decisions he would if he were managing a business of his own. The interests of one group of constituents may be opposed to those of another, and, rightly or wrongly, his position as an elected representative of the people comes first.

To take a simple example, the purchase of gas in bulk may mean throwing men out of employment, and it is difficult for a councillor to take the long view. Civic pride in the ownership of the gas undertaking may prevent an advantageous sale of that undertaking. Parochial jealousy often prevents amalgamation with neighbouring municipalities.

With regard to the company-owned undertakings, many boards of directors are not trained in the particular qualities necessary to control the undertakings. The amount of time given to the affairs of the company is small and the casual director is not familiar with the trend of progress. Often he is not fully aware of the intensity of competition. In such cases, the management is in the hands of the chief officials, who would not be expected to initiate developments in the direction of rationalization without encouragement.

Of course, there are many outstanding exceptions, many of the leaders of the Industry spending their whole time as directors, or in an administrative capacity. As a rule, these men are prominent in the movements indicated.

The personal element cannot be overlooked. A director is often averse to parting with the emoluments and importance which go with the position. It is usual to compensate on amalgamation to the extent of seven years' purchase of the fees for abolition of office, and holding companies as a rule pay this sum when a director relinquishes his office, but although this may be attractive to a man of more than middle age, others are averse to losing the office, even with the adequate compensation named.

The chief officers are in a somewhat different position. In the case of amalgamation, Parliament insists upon compensation being restricted to that permissible under a scale, primarily intended to apply to the Civil Service, which is based on age and years of service. This scale may prove satisfactory to a man past middle age; in fact, the capitalized pension may be considerably better than the company he is serving could afford to pay.

In the case of the young man, however, the compensation in the event of loss of office may appear inadequate, or he may not welcome being in a subordinate position in the absorbing company, in place of the "chief" in the smaller undertaking. He fears that the scope is less, although in the writer's opinion this view is wrong. The holding companies usually give agreements for continuity of service, or pension alternatives, but nevertheless the chief officials do not welcome the movement at present.

The officers may be averse to purchasing gas in bulk because they feel that their importance is thereby reduced and consequently their scope for improvement is narrowed. In particular, the engineer deplores the lost opportunities of technical experience which would come from works extensions.

Whether these fears are well founded or not, the fact remains that the personal feelings of directors and officers have prevented many desirable amalgamations and progress towards rationalization.

IV. Rates and Rate Making.

Although the idea of differential rates designed to promote sales had its origin in Great Britain, very little progress has been made until recently in their general application. As far back as 1892, Messrs. Anderson Bros. put a two-part tariff into operation in some of the companies under their control. In 1905 Mr. Meunier stressed the importance of considering some system alternative to the straight meter rate (which is known in Great Britain as the flat rate). The alternative system best known in Great Britain is the Halifax system, introduced by Mr. W. B. McLusky. This was the first large-scale experiment in optional two-part tariffs. At the same time the application of scientific rate-making and the basis of rate structures can only be regarded as in its infancy.

The fundamental difficulty confronting those in Great Britain engaged in the preparation of promotional rates is the fact that although a minimum charge may be imposed in the case of telephone, telegraph, water, and electricity services, no such minimum or service charge may be imposed in respect of gas. No gas consumer can be compelled to pay any charge other than that calculated according to the quantity of gas actually consumed and, as explained in the British Paper on Public Regulation of Private Gas Utilities, there is either a maximum price prescribed for each therm consumed or the dividend which the company may pay is determined in relation to the price per therm charged. In 1927 the National Gas Council issued a report on gas charges, the basis of which was two reports upon investigations into American practice. It may be accepted that the Gas Industry in Great Britain in the absence of authority to impose a minimum or service charge has not yet made up its mind whether alternative tariffs are desirable or not. The caution of the Industry may be partially due to the position of the electricity supply industry which has many multi-part tariffs in force. The variety of such tariffs has become so marked that the electricity supply industry has given serious consideration for some time past to their simplification by endeavouring to agree upon a common basis.

Furthermore, the public have often expressed preference for the straight-meter rate so widely employed for the sale of gas, and gas administrators have feared the reaction of the consumer should he be called upon to pay a standing charge for gas in addition to that which he now pays for electricity.

As pointed out in the Paper just referred to recent legislation and particularly the introduction of the basic-price system has given gas companies greater scope in the framing of tariffs. The Gas Industry must now charge by one or other of the following methods:

(*a*) A straight meter rate (which, as already mentioned, is known in Great Britain as a flat rate) per therm consumed with or without discounts for quantity or prompt payment, coupled with a two-part or similar tariff of which the consumer has the option of availing himself. This optional tariff is, however, limited in scope.

(*b*) A straight meter rate (without any discount except for prompt payment) of which public notice has to be given, coupled with any tariff which may be agreed with the consumer. The only restriction upon this tariff is that it must be identical in the case of supplies given for the same purposes and in like circumstances.

Under method (*a*) there is the risk that a consumer electing to pay at the tariff rate might be charged a high price per therm actually consumed. In the case of a maximum price company, this rate per therm might exceed the prescribed maximum rate per therm, in which case the excess amount would not be recoverable at law, while in the case of a sliding-scale company the rate might be sufficiently high to cause the authorized rate of dividend to vanish.

As explained in the Paper on Public Regulation of Private Gas Utilities method (*b*) enables these difficulties to be overcome, because the act of "publishing" a price per therm frees both the maximum-price company and the sliding-scale company from the risks mentioned. There are still, however, 203 sliding-scale companies, and any increase in the straight meter rate published reduces the rate of dividend which such companies are authorized to pay.

Under existing legislation, therefore, the tendency of such companies must be to refrain from increasing the published price, with the result that a large number of their consumers continue to be supplied at a loss and to be subsidized by the remaining consumers. In these circumstances, progress in rate making is necessarily slow. Nevertheless, some hundreds of gas undertakings have adopted tariffs other than the straight meter rate, including block rates, two-part rates, and occasionally three- and four-part rates.

For the reasons already mentioned, however, it is evident that a block rate cannot contain an effective hidden service charge. Apart from these reasons, however, there has been but little surplus revenue in the last few years. Had this surplus revenue been available, it would in many cases have been given to the larger consumers by way of regraded tariffs.

Experience has proved that the two-part tariff has had a marked effect on increasing gas sales to both industrial and domestic consumers. The Stretford Gas Board have an industrial three-part rate in which the commodity charge gets as low as 10d. per 1,000 cu.ft. (2d. per therm) with manufactured gas, and Sheffield gets down to below this figure in a block rate with gas purchased from coke ovens.

Table IV gives typical dissections of accounts showing the relative costs on the two-part and four-part tariff basis, and the corresponding straight meter rate to produce the same financial results:

TABLE IV.—*Two-Part and Four Part Analyses.*

Two-Part Analysis.

Undertaking.	Annual Service Cost.	Commodity Cost.	Equivalent Straight Meter Cost.
	£ s. d.	Pence per Therm.	Pence per Therm.
A	2 0 11	4·7	7·3
B	1 16 2	5·1	8·2
C	2 5 3	8·6	11·5
D	2 9 10	6·1	9·1
E	2 15 9	5·0	8·0

Four-Part Analysis.

Undertaking.	Service Cost per Customer per Annum.	Demand Costs (Manufacturing Distribution). Per Therm of Maximum Daily Demand.	Demand Costs (Manufacturing Distribution). Per Therm of Maximum Hourly Demand.	Commodity Cost.	Equivalent Straight Meter Cost.
	£ s. d.	£ s. d.	£ s. d.	Pence per Therm.	Pence per Therm.
F	1 1 0	0 18 2	8 3 6	3·28	7·5
G	1 5 0	1 16 4	24 0 10	2·64	8·9
H	1 2 0	1 7 8	20 6 8	3·95	10·4
I	1 2 6	1 6 0	17 6 0	4·60	9·8

Multipart rates based on this analysis, however, could not be enforced by the undertakings in question because the consumer must have the option of being charged on a straight meter rate and this would result in the consumers who are likely to save substantially, adopting the multipart rates, and others rejecting them. In short, without compulsion, the reconstruction of tariffs must proceed with caution.

There are no exact figures available giving the amount of gas sold for various purposes but the following is an approximation based on a total sale of gas in England, Wales, and Scotland of 300,000 million cu.ft.

	%
For Domestic purposes	78
Commercial purposes	5
Industrial purposes	9
Public lighting	8

Many undertakings sell large quantities of gas for industry which is largely the result of attractive tariffs. For example, Sheffield and Rotherham, over 60%; Birmingham, Coventry, and Derby, about 35%; Slough, 32%; Watford and Maidstone, 17%.

V. Social Aspect and Relations with Electricity.

Gas is admitted to be part of the social organization of Great Britain. It is supplied to 10 million homes—probably 95% of the population. Failures are so few that they can be ignored for practical purposes. It is doubtful whether in the course of ten years there have been half a dozen failures in the 1,200 odd undertakings throughout the country. The progress of gas sales has suffered from competition from electricity in exactly the same manner as purveyors of candles and oil suffered at the time of the introduction of gas. Equally important, however, is the improved efficiency of the consuming appliances which are from 10 to 30% more efficient than ten years ago.

The changing habits of the people have also had an important bearing on sales. Less time is spent at home, more time in the country, and the cinemas, coupled with the café and restaurant habit, have distinctly decreased cooking at home. The coming of the motor car and the rehousing of the people have also contributed their quota, because the more money spent on these things, the less can be spent on what were at one time regarded as necessities.

However, the Industry has made up for all these losses by finding increased uses in the home and industry. The improved position of the housewife is marked. She has more leisure and less trouble. The condition in the cities

is markedly improved, due not only to the use of gas, but to the use of electricity and coke.

For all practical purposes electric and gas utilities in Great Britain are under separate ownership. Where municipalities provide both services, they are usually controlled by separate committees, although there are several cases where heat, light, and power committees have been instituted. These committees have not been functioning long enough to enable judgment to be formed as to the advantages to the utilities or the consumer. There is intense competition between the two industries and the activities of the electric grid have undoubtedly stiffened such competition. The grid has brought electricity into the homes of more people and consequently affected the smaller undertakings. The grid, however, has not cheapened electricity in the towns, with the result that the larger gas undertakings still hold their own, having got over the effect on sales of the first introduction of electricity.

It is natural to find the older industry producing relatively small increases. A great proportion of the artisan class still prefer gas for lighting on account of the warmth it brings, but in new houses electric lighting is almost universal.

Electricity is competing strongly for the domestic heating and cooking load. Certain progress has been made, but in general it is quite fair to say that gas still provides the cooking and heating for the masses of the population.

Gas is holding it own fairly well for street lighting.

Industrial power is chiefly electric.

Mention has previously been made of the large amount of gas sold for industrial purposes, and this is undoubtedly the most favourable field for the increase of business for the Gas Industry in the future.

Most rate structures are a compromise between a promotional tariff and the calculated cost to each class of consumer. Undertakings introducing alternative tariffs to domestic consumers have made great progress as far as the sale of gas is concerned, but there is not sufficient data available up to the present to estimate the financial effect on the undertaking after a systematic propaganda over a period of years.

Technicians and statesmen are beginning to see that the fuel problem is one that should be tackled as a whole. Any rationalization which can be effected within the industry itself is definitely towards this end, and even the shutting up of a gas-works which is relatively inefficient or the centralization of plant for the working of residual products are means towards this desirable end.

Further Gas Undertakings' Results

Chesterfield.

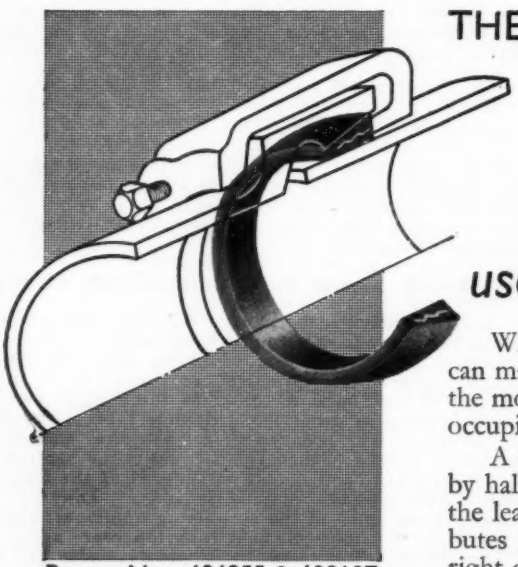
The report of the Engineer and Manager, Mr. H. Davies, upon the past year's figures relative to the Chesterfield Gas Undertaking, states that there has been a record sale of gas, which has been steadily increasing throughout the year, all previous daily, monthly, and annual sales having been largely exceeded. This increase amounts to 57,722,000 cu.ft., or 12·85%, and follows an almost similar increase of the previous year. The gas sold was 506,832,000 cu.ft. The income from gas rentals, which includes hire of prepayment installations and meters, was £59,949. The yield of coke and tar and the prices received for them have been regular, while benzole is now being extracted and sold. In November, 1935, the coke ovens put into operation their new purifying, boosting, and measuring plant, and until this had been accomplished, the increased demand for gas was carried by our own works, and in consequence the annual repairs to carbonizing plant could not be as complete as were intended. The three-lift column-guided gasholder in use as a relief holder in the manufacture of carburetted water gas was replaced by a similar sized spirally guided holder in the existing brick tank. From the commencement of the December quarter the scales of charges for gas and also for meter rents were reduced, and after the December quarter the charge to prepayment consumers for the use of piping and fittings installed by the Undertaking was discontinued.

Maryborough (Queensland).

The report of the Directors of the Maryborough [Queensland] Gas and Coke Company for the half-year to June 30, 1936, states that the gas sales show an increase as compared with the corresponding period of 1935. Sales of residual products are slightly less than last year. Expenditure is less than 1935, due principally to less income-tax being paid. After writing off £400 for depreciation, and making provision for all other charges, the profits amount to £996. To this amount has to be added £326 brought forward from last half-year, making the total amount at credit of profit and loss account, £1,323. The Directors have recommended the payment of a dividend of 5% per annum, amounting to £1,031, leaving a balance to be carried forward of £292.

Metropolitan Gas Company (Melbourne).

The report of the Directors of the Metropolitan Gas Company, of Melbourne, for the year ended June 30, 1936, states that there is a profit of £197,192, to which is added the amount brought forward of £70,624, making £267,816, which, less interim



THE **STANTON**
MECHANICAL
LEAD JOINT
uses this pre-cast lead ring

With an ordinary spanner, an unskilled workman can make this leaktight, trouble-free lead joint under the most difficult conditions in a fraction of the time occupied by lead melting, running and caulking.

A pre-cast lead ring is held positively in position by half-collars secured by cast-iron setscrews. Inside the lead is cast a spring insertion ring, which distributes the end pressure so that the joint is effective right down to the tip.

The completed Joint holds high air and water pressures, and permits "draw" of the spigot and angular distortion.

Patent Nos. 404955 & 433137

No increase in cost of pipeline

The Stanton Ironworks Company Limited, Near Nottingham

dividend paid on Feb. 14, 1936, £84,500, and amount transferred to reserved fund account, £25,000, leaves a balance at the credit of net revenue account of £158,316. The Directors now recommend the payment of final dividend for the year at the rate of 6s. 6d. per share, amounting to £84,500, leaving a balance to be carried forward of £73,816.

South Australian Gas Company.

The seventy-fifth annual report of the Directors of the South Australian Gas Company states that the profit for the year ended June 30, 1936, after paying interest on bonds and adding balance (£11,139) carried forward from last year, amounted to £102,570. This has been applied in the following manner: Dividend for half-year ended Dec. 31, 1935, at the rate of 5% per annum, £35,000; dividend for half-year ended June 30, 1936, at the rate of 5% per annum, £35,000; transferred to Special Purposes Fund, £19,176, leaving a balance to be carried forward in profit and loss account of £13,394.

Trade Notes

Simplified Handling.

We have received from Herbert Morris, Ltd., of Loughborough, a copy of their recently issued brochure dealing with two more of the firm's labour-saving handling devices.

The Morris "once-handling" plan has a strong appeal; instead of loading and unloading goods every time it is required to use them, the articles are put on a platform in the first place and thereafter moved by means of the Morris pedal-operated elevating truck for transport. The saving in re-handling is all clear gain, while the use of platforms instead of the floor simplifies the checking of goods. One Morris truck will deal with fifty platforms or more. Ball-bearings, together with the simplest lifting mechanism, reduce to a minimum the effort to lift and move the heaviest loads.

The other machine is the Morris stacker, with the help of which boxes, bales, bags, barrels, cases, or crates may be stacked, not just man high, but right up to the ceiling, thus utilizing many cubic feet of once empty storage space. The leaflet illustrates various applications of these two useful machines, either of which could serve a useful purpose in gas undertakings' stores or stove shops.

"Multi-Pull Displays."

Particulars of their display service have been forwarded to us by the Priestley Studios, Ltd., 42, Newgate Street, E.C. 1. The firm have a large staff of competent artists capable of handling every form of art work. Rough sketches are free, and conditions of the Association of Display Producers and Silk Screen Printers are operative. They are fully equipped for every type of order. Where speed is the essence of the contract, they inform us that they will not be found wanting. Every job is carefully supervised. Displays are packed and despatched to any address direct from the works, the installation of the displays being undertaken throughout the British Isles by competent window dressers who are resident in practically every large town. Window installations are inspected and reported on each week, thus assuring that retailers are satisfied, and that the manufacturer's interests are served.

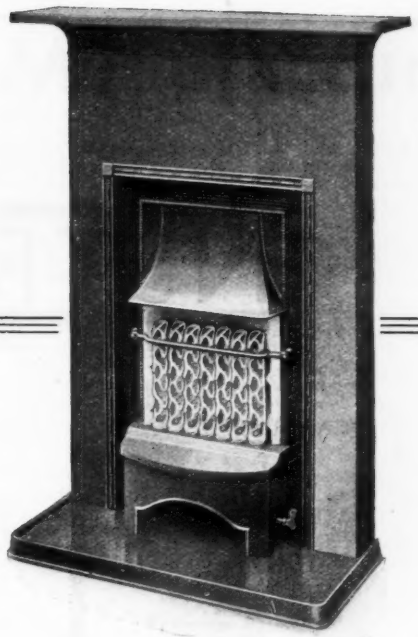
Periodic renovations, especially in the case of large and expensive displays, are a definite saving in cost. The Priestley Studios are pleased to quote for this renovation service. For the convenience of customers the firm store displays at their works, Commercial Road, Gloucester, and in London.

"Foochow" Oriental Lacquers and "Synroz" Synthetic Enamels.

Continuous development and increased output at the two factories of Donald Macpherson & Co., Ltd., at Manchester and London, where "Foochow" materials are manufactured, is in many instances directly due to the work carried out in their Investigation and Development Departments. The outcome of this work is the evolution of new high heat-resisting lacquers in attractive colours, of distinct interest to all manufacturers of heating and domestic hardware appliances.

The firm continues to justify its slogan "The Most Rapid of all High Class Finishes," and this claim is extended further in the case of Heating Appliance Manufacturers since "Foochow" oriental lacquers and "Synroz" synthetic enamels are claimed to be of the highest heat-resisting type yet made. A large increase in output of these modern finishes has enabled the manufacturers to offer them at moderate prices. Another important point to note is that the number of times of application necessary, when using the finishes, has been further reduced. In these days of standardization and mass production, speed in finishing is necessary; while these materials offer speed in finishing, they afford distinctive and certainly attractive and sales compelling effects not usually associated with speed and mass production.

The British Colour Council shades are accepted by the "Foochow" firm, as a standard for many decorative and general industrial finishes. Industrialists looking for modern finishes at the right price are assured, with the help of Donald Macpherson & Co., Ltd., of a quality and range which must be immediately and definitely helpful.



No. 1145G Gas Mantel Reg ster Grate with Raised Hearth Plate.

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For New Homes—

CARRON

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Ideal for Bungalow, Flat, etc.

Can be supplied Metallic Enamelled in Imitation Wood Finish.

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DIAL and MAIN THERMOMETERS

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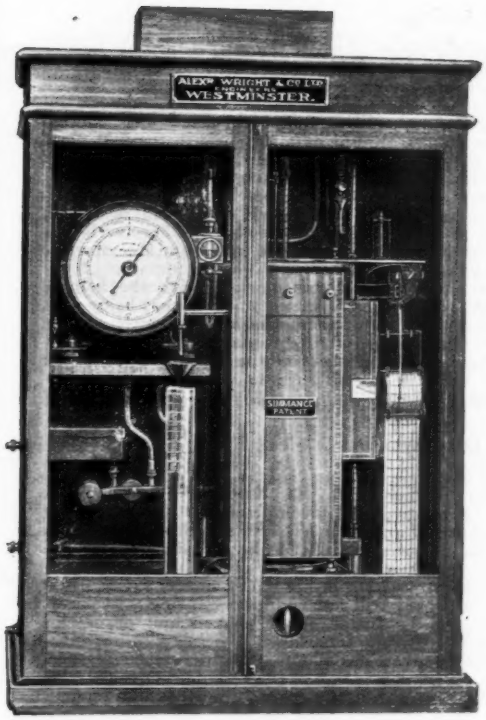
FUEL CALORIMETERS



The Simmance Patent
'POSITIVE RECORD' GAS CALORIMETER has been *proved* by a large number of Gas Engineers at home and abroad to be entirely satisfactory. ITS LOW PRICE is attractive, and its constructional and technical details combine neatness and simplicity with fine workmanship.

ALEXANDER WRIGHT & Co. LTD. WESTMINSTER

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

A certain element of doubt as to the possible effect of the franc devaluation, coupled with the closing of the Paris Bourse until Friday, led to a curtailment in the volume of business on the Stock Exchange last week. There was some selling of gilt-edged securities earlier on, but the lowered prices soon brought in buyers, and in nearly all cases quotations soon regained their former levels. Just at the close, however, the tone became more cheerful; active conditions were reported in nearly all sections, and under the stimulus of Sir Samuel Hoare's speech a heavy demand set in for iron and steel shares and the securities of allied trades. Oils rallied and gold shares, after a somewhat eventful week, were inclined to harden. It was satisfactory to note that dealings in the new London County 3% loan closed at 1⅞ premium.

The Gas Market was active throughout the week and the general tone continued firm. On the London Exchange, and also at Birmingham and Manchester, there was an exceptionally heavy demand for Imperial Continental stock and the quotation improved 16½ points to 160, while the prices of recorded transactions ranged from 138 to 163. South Metropolitan, on the other hand, suffered a relapse. The publicity given to the Company's recent gas tariff brought a number of unnecessarily nervous holders into the market, with the result that sellers predominated and the quotation was marked down 12½ points to 115. At the Provincial Exchanges the feature was a rise of 8½ points in Derby consolidated to 187½, which on a dividend of 8½%, the rate paid since 1927, gives a yield of £4 10s. 6d.%, and having regard to the Company's progress and strong financial position the improvement is amply justified. In the Supplementary List the only change of note was a gain of 2s. 6d. in the nominal quotation of the South Midland Corporation ordinary shares to 23s. 6d.

The Directors of the United Kingdom Gas Corporation, Ltd., report that they have acquired 90·35% of the ordinary capital of the Hyde Gas Company. Of the purchase consideration £48,452 was taken in shares of the Corporation, thus bringing the total issued share capital up to £2,154,476. They also announce an interim dividend of 2% on the ordinary shares, which will be paid on Oct. 15.

Current Sales of Gas Products

The London Market for Tar Products.

Oct. 5.

Prices of tar products in general remain unchanged, to-day's values being as follows:

Pitch, nominal at 35s. per ton, f.o.b.

Creosote, about 5½d.

Refined tar, 3¾d.

Pure toluole, 2s. 3d. to 2s. 4d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 7d.; and 90/160 pyridine, about 5s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Oct. 5.

The average prices of gas-works products during the week were: Gas-works tar, 19s. 3d. to 24s. 3d. Pitch—East Coast, 33s. to 35s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 33s. to 35s. 6d.* Toluole, naked, North, 1s. 11d. to 2s. Coal tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5½d. Heavy naphtha, North, 1s. 1½d. to 1s. 2½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 5d.; low gravity, 4½d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 2s. 5d. to 2s. 7d. Naphthalene, £19 to £21. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 3d. to 3½d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Oct.* 3.

There is evidence of business becoming rather slower in this district although, in the meantime, prices are well maintained. The heavy products still suffer from over-production.

Crude gas-works tar.—The actual value is 34s. to 35s. per ton *ex* works in bulk.

Pitch.—This is a disappointing product and quotations are unstable at 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—It is considered that any reduction in price would not induce further business and therefore quotations are maintained at 3d. to 3¼d. per gallon, f.o.r. for export, and 3¾d. to 4d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—So far as new business is concerned there is a lull, but deliveries *ex* contract are proceeding quite freely. Specification oil, 4½d. to 4¾d. per gallon; low gravity, 4¾d. to 5d. per gallon; neutral oil, 4½d. to 4¾d. per gallon; all *ex* works in bulk.

Cresylic acid.—No further increase has taken place during the week and the small quantities available are commanding about the following prices: Pale, 97/99%, 2s. 3d. to 2s. 5d. per gallon; dark, 97/99%, 2s. to 2s. 2d. per gallon; pale, 99/100%, 2s. 9d. to 3s. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Production is small and value is steady at 5½d. to 6d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 5½d. per gallon and 90/190 heavy naphtha is 11d. to 1s. per gallon.

Motor benzole continues to be valued at 1s. 3½d. to 1s. 4d. per gallon.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon and 90/140 grade is 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 8½	to	0 9	per gallon at works
Motor ,, . . .	1 2	,,	1 2½	,, ,, ,,
90% ,, . . .	1 3	,,	1 3½	,, ,, ,,
Pure ,, . . .	1 7	,,	1 7½	,, ,, ,,

Fertilizer Prices

Imperial Chemical Industries announce the following prices for the forthcoming season:

	£ s. d.		For Delivery in—
Sulphate of ammonia . . .	6 17 6	..	October, 1936
	6 19 0	..	November, ,,
	7 0 6	..	December, ,,
	7 2 0	..	January, 1937
	7 3 6	..	February, ,,
	7 5 0	..	March, ,,
Nitro-chalk	7 5 0	..	Up to June, ,,
Concentrated fertilizers—No. 1	11 1 0	..	Ditto
,, 2	10 19 0	..	,,
,, 3	11 0 0	..	,,
,, 4	10 15 0	..	,,
,, 5	10 12 0	..	,,
,, 6	10 16 0	..	,,
N.P. "A"	13 15 0	..	,,
"B"	10 5 0	..	,,
"C"	12 5 0	..	,,

For delivery buyer's station in minimum 6-ton lots subject to usual conditions.

All the above prices are the same as those ruling last season with the exception of those concentrated fertilizers that contain potash, which have advanced by 1s. or 2s. per ton.

Further Gas Undertaking's Results

Deal and Walmer (South-Eastern).

The Directors' report on the accounts of the Deal and Walmer Gas Company for the year ended June 30, 1936, show that after paying in respect of the half-year to Dec. 31, 1935, dividends at the rate of: £6 10s.% per annum on the redeemable preference stock and £7 15s.% per annum on the ordinary capital stock, and after paying all fixed charges, making provision for depreciation, and allocations to the renewal and benefit funds, there is a total available balance of £5,554, out of which the Directors recommend the payment (less income-tax), of the following dividends in respect of the half-year to June 30, 1936, at the rate of: £6 10s.% per annum on the redeemable preference stock and £7 15s.% per annum on the ordinary capital stock, which together will absorb the sum of £3,687, leaving £1,867 to be carried forward to the credit of the current year. The sale of gas during the past year shows an increase of 6·33% over that of the previous year.

● *Apply* **SCIENTIFIC CONTROL** *to the best advantage by adopting*

THE WEST SYSTEMS

OF MODERN GAS AND COKE PRODUCTION

The West organization has co-operated with progressive Gas Undertakings in 24 countries in their schemes of works modernization, plant renewal, and extension.

- GLOVER-WEST VERTICAL RETORTS
- WESTVERTICAL CARBONIZING CHAMBERS
- BREEZE-FIRING PRODUCER EQUIPMENT
- WASTE-HEAT RECOVERY PLANTS
- THE WEST LIP-BUCKET CONVEYOR WITH AUTOMATIC LUBRICATION
- COKE-GRADING AND PREPARATION UNITS

Contracts placed with West's Gas Improvement Company, Ltd., during the present year have included carbonizing plant installations for the Gas Undertakings of *Altrincham, *Bilston, *Carlisle, *Dudley, *Worcester, and *Yeadon, in England ; *Dumbarton, *Grangemouth, and Kelso, in Scotland; *Ballymena, in Ireland, and *Johannesburg, in South Africa.

* Repeat orders

WEST'S GAS IMPROVEMENT COMPANY, LTD.

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LONDON: COLUMBIA HOUSE, ALDWYCH, W.C. 2 — 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Oct. 2	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 7	7⅞	8	Alliance & Dublin Ord. ...	161—166	...	165½
374,000	,,	June 22	4	4	Do. 4 p.c. Deb. ...	94—99	...	...
557,655	,,	Aug. 10	7	7	Barnet Ord. 7 p.c.	167—172	...	...
300,000	1	Mar. 30	1/4½	1/9⅜	Bombay, Ltd.	26/6—28/6	...	27/6
179,305	Stk.	Aug. 10	9½	9½	Bournemouth sliding scale ...	220—230	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	169—170
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	...
50,000	,,	June 22	3	3	Do. 3 p.c. Deb. ...	84—89	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	109
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	124½
357,900	,,	Aug. 10	7½	7½	Brighton, &c., 6 p.c. Con. ...	168—173	...	...
649,955	,,	,,	6¼	6¼	Do. 5 p.c. Con. ...	153—158	...	158
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	142—147	...	...
855,000	,,	Mar. 2	7	8	British Ord.	158—163	...	161—162½
100,000	,,	June 8	7	7	Do. 7 p.c. Pref.	151—156	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—115	...	...
200,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	97—99	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	June 22	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	July 20	6	6	Cardiff Con. Ord.	128—133	...	...
237,860	,,	June 8	5	5	Do. 5 p.c. Red. Deb.	108—113	...	...
609,204	1	Mar. 30	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	18'—20/-	...	...
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	...
1,775,005	Stk.	Aug. 10	5	5	Commercial Ord.	95—100	...	95—97½
620,000	,,	June 8	3	3	Do. 3 p.c. Deb. ...	84—89	...	86½
286,314	,,	Aug. 10	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
807,560	,,	Aug. 10	7	7	Croydon sliding scale ...	157—162	...	160½—161½
644,590	,,	,,	5	5	Do. max. div.	115—120	...	117—118½
620,385	,,	June 22	5	5	Do. 5 p.c. Deb.... ...	123—128	...	126
239,000	,,	Aug. 10	5	5	East Hull Ord. 5 p.c.... ...	107—110	...	...
184,555	,,	Aug. 10	6	6	East Surrey Ord. 5 p.c. ...	128—133	...	...
176,211	,,	June 8	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
250,000	1	June 22	4	6	Gas Consolidation Ord. ...	20/6—22/6	...	...
250,000	1	May 18	4	4	Do. 4 p.c. Red. Cum. Pref.	19/-—21/-	...	19/9—20/2½
19,284,128	Stk.	Aug. 10	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	27/3—28/3a	...	27/3—27/10½
2,600,000	,,	,,	3⅜	3⅜	Do. 3⅜ p.c. max.... ...	89—92	...	91—92
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—109	+1	107½—109
8,602,497	,,	May 18	3	3	Do. 3 p.c. Con. Deb. ...	88—91	...	89½—90½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	117—120	...	118½—119½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	116½
700,000	,,	Sept. 7	...	25/5§	Do. 3½ p.c. Red. Deb. ...	102—104*	...	...
270,466	,,	Aug. 24	6	6	Harrogate New Cons. ...	128—133	...	...
157,500	1	Mar. 16	1/7½	1/7½	Hongkong & China, Ltd. ...	1 3/16—1 7/16	...	...
213,200	Stk.	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	133—138	...	...
5,600,000	,,	May 18	8	12	Imperial Continental Cap. ...	155—165	+16½	138—163
223,130	,,	July 20	3½	3½	Do. 3½ p.c. Red. Debs.	92—97	...	95½
285,242	,,	Aug. 24	8½	8½	Lea Bridge 5 p.c. Ord. ...	172—177	...	...
11,751	,,	,,	10	8	Maidstone Gas 5 p.c. Cap. Stk.	190—200	...	...
63,480	,,	June 22	3	3	Do. 3p.c.Prp.Db.Sk.	80—85	...	82
75,000	,,	May 18	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	190—200	...	195
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—105*	−2	...
231,978	Stk.	Aug. 24	5	5	M.S. Utility 'C' Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105½—106½
360,075	,,	June 22	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	122—127	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	Stk.	June 22	†3	†6	Montevideo, Ltd.	70—75	+2	...
225,000	,,	Aug. 10	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Aug. 10	5	5	Northampton 5 p.c. max. ...	110—115	...	...
300,000	,,	Apl. 20	†9	†7	Oriental, Ltd....	165—170	...	...
416,617	,,	June 8	8	8	Plymouth & Stonehouse 5 p.c.	168—173	...	...
504,416	,,	Aug. 10	8½	8½	Portsmouth & Gosport Cons.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	112—117	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	118—123	...	...
114,000	,,	July 20	5	5	Preston 5 p.c. Pref.	110—115	...	...
363,470	1	Sept. 21	1/-	1/-	Severn Val. Gas Cor. Ld. Ord.	21/—23/-*	...	22/—22/9
454,510	1	,,	-/10½	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/—23/-*	...	22/—22/6
133,201	Stk.	Aug. 24	5	8½	Shrewsbury 5 p.c. Ord. ...	145—150	...	...
90,000	10	June 8	‡3½	‡4	South African...	4—5	...	90/-
1,152,595	1	Sept. 7	1/2½	1/2½	South East'n Gas Cn. Ld. Ord.	27/—29/-	...	27/6—29/-
845,511	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/—23/-	...	...
200,000	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20/6—21/6	...	...
450,000	Stk.	Aug. 10	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Aug. 10	6½	5	South Met. Ord.	110—120	−12½	115—127
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	145—150	...	147½
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	104—107	...	105½
1,895,445	,,	June 22	3	3	Do. 3 p.c. Deb. ...	87—90	...	88½
1,000,000	,,	July 6	5	5	Do. 5 p.c. Red. Deb.	114—117	...	...
1,543,795	,,	Aug. 10	6	6	South Suburban Ord. 5 p.c....	129—134	...	132—133
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	122—127	+1	125—126
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	102—107	...	...
888,587	,,	June 8	5	5	Do. 5 p.c. Deb....	123—128	+2	123
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	102—107	...	...
427,859	1	May 4	9⅜	1/2½	S. Western Gas & Water Ord.	21 6—23/6	...	22/6—22/9
160,523	1	Apl. 20	...	-/10½	Do. 4½% Red. Cum. Pref.	21/—23/-	...	22/9
110,000	Stk.	June 22	4	4	Do. 4% Red. Deb. ...	100—105	...	103½
647,740	,,	Aug. 10	5½	5	Southampton Ord. 5 p.c. ...	112—117	...	115½
121,275	,,	June 8	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 10	5½	5½	Swansea 5½ p.c. Red. Pref. ...	109—114	...	114½
106,000	,,	June 8	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	...
94,000	,,	,,	...	...	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 10	6¾	6¾	Tottenham and District Ord.	149—154	...	...
409,835	,,	,,	5⅝	5⅝	Do. 5½ p.c. Pref....	128—133	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
371,850	,,	June 8	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
369,774	,,	Aug. 10	7	7	Uxbridge, &c., 5 p.c. ...	155—160	...	157½
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	122½
1,340,521	,,	Aug. 10	7	7	Wandsworth Consolidated ...	159—164	...	162
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	125½
500,000	,,	,,	...	...	Do. 4 p.c. Pref. ...	104½—107½	...	107
1,317,964	,,	June 8	5	5	Do. 5 p.c. Deb. ...	125—130	...	128½—130
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
499,735	,,	Aug. 10	7¼	7	Watford and St. Albans Ord.	153—158	...	158
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	131—136	...	...
200,000	,,	June 22	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	99—102	...	...
158,400	,,	Aug 24	6b	5⅛	Winchester W. & G. 5 p.c. Con.	120—125	...	...

a.—The quotation is per £1 of Stock. b.—Paid £3, including 10s. on account of back dividends. * Ex div.
† Paid free of income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

"Modern Gas Fitting"

PART VI.

of

Gas Fitting Pamphlets

Another of the Popular Series

of reprints, in booklet form, of the articles on "Modern Gas Fitting," contributed monthly to the

"GAS SALESMAN"

by

R. N. LeFevre, M.Inst.Gas E.

Officer-in-Charge of Training, The Gas Light and Coke Company, Assistant Head of Department of Gas Engineering and Supply, Westminster Technical Institute.

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Parts I to V have been reprinted, and can also be supplied.

STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Oct. 2.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 20	6	5	Bath Cons.	122½—124½	...	...
1,667,250	,,	July 6	5	5	Bristol, 5 p.c. max.	120—122	...	...
120,420	,,	June 8	4	4	Do. 1st 4 p.c. Deb. ...	101½—103½	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101½—103½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	124—127	...	...
274,000	,,	Aug. 10	5	5	Newport (Mon.) 5 p.c. max....	110—114	...	...
13,200	12	Sept. 7	8½	7	Pontyp'l Gas & W. 10 p.c. 'A.'	13½—14½	...	...
13,600	10	,,	6	5	Do. 7 p.c. B.'	11½—12½	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C.'	11½—12½	...	...
140,778	Stk.	Aug. 10	5	5	Weston-super-Mare Cons. ...	112—114	...	...
64,338	,,	June 22	4	4	Do. 4 p.c. Deb.	96½—98½	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	163—166	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug 10	6½	5	Chester 5 p.c. Ord.	107—112	...	...
92,500	,,	June 8	4	4	Do. 4 p.c. Pref.	98—102	...	...
32,540	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	135—137	+2	136—136½
245,500	,,	June 22	5	5	Do. 5 p.c. Red. Pref ...	103—108	...	...
306,083	,,	July 6	4	4	Do. 4 p.c. Deb. ...	104—106	...	...
106,280	,,	July 20	10	10	Preston 'A' 10 p.c. ...	198—208	...	...
189,219	,,	,,	7	7	Do. 'B' 7 p.c.	137—147	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Aug. 10	8	8	Blyth 5 p.c. Ord.	153—155	...	...
732,000	,,	Aug. 10	5	5	Hartlepool G. & W. Cn. & New	121—123	+ 1	...
2,061,315	,,	Aug. 10	5½	5	Newcastle & Gateshead Con.	27/9—28/3a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	103—105	...	...
776,706	,,	June 22	3½	3½	Do. 3½ p.c. Deb. ...	99—101	...	...
277,285	,,	May 4	5	5	Do. 5 p.c. Deb. '43...	103—104	...	...
209,820	,,	Aug. 10	8½	8½	South Shields Con.	172—174	...	...
299,542	,,	Aug. 10	6	6	Sunderland 6 p.c. max. ...	130—132	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 10	10	7	Derby Con.	185—190	+8½	...
55,000	,,	June 22	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	June 8	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,008	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Aug. 24	6	6	Sheffield Cons.	144—146	...	...
95,000	,,	July 6	4	4	Do. 4 p.c. Deb.	102—105	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Sept. 7	...	5	Ascot Ord.	117—122	...	...
128,182	,,	July 6	...	5	Do. 5 p.c. Pref.	115—120	...	...
238,631	1	June 8	5	5	Assd. Gas and Water Ord. ...	21/—23 -	...	...
323,681	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21/6—23/6	...	...
150,000	Stk.	Sept. 21	...	3½	Do. 3½ p.c. Red. Deb. ...	98—101*	...	...
17,000	,,	Aug. 24	8	8	Bognor Orig. Ord. 'A' ...	175—185	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	175—185	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	145—150	...	...
37,440	,,	Aug. 10	10	10	Cam.Univ. & Town 10 p.c.max.	205—215	...	212
125,970	,,	,,	7	7	Do. 7 p.c. max.	155—160	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	108—113	...	...
65,000	,,	Aug. 10	8½	7½	Eastbourne 'A' 5 p.c. ...	168—173	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	140—145	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
130,000	,,	June 22	5	5	Do. 5 p.c. Deb.	124—129	...	...
24,000	30	Aug. 10	8½	8½	Great Yarmouth 8½ p.c. max.	51—56	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	42—45	...	...
51,160	Stk.	June 8	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...
152,600	,,	Sept. 7	8	8	Guildford Cons.	182—192	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119	...	...
68,250	,,	June 8	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Aug. 24	7½	7½	Hampton Court Cons. ...	173—178	...	...
107,960	10	Mar. 16	4	5½	Mid Kent Ord.	10—11	...	...
230,940	Stk.	Aug. 10	10	10	Oxford & District Ord. ...	205—215	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pre ...	113—118	...	...
126,193	,,	May 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Sept. 7	6½	7½	Redditch Ord.	133—143	...	...
166,850	,,	Aug. 10	9	8	Romford Ord.	168—178	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 21	5	5	Do. 5 p.c. Deb.	120—125*	−2	...
10,950	,,	Aug. 24	8	8	Ryde Ord.	165—170	...	...
136,191	,,	Aug. 10	7	5	Scarborough Ord.	126—136	...	...
27,825	,,	Aug. 24	8	8	Shanklin & Ventnor Cons. ...	180—190	...	...
40,643	,,	Sept. 21	7	7	Slough Ord.	156—161*	+6	...
221,000	,,	June 22	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	May 4	5½	5½	S. Midland Gas Cpn.Ltd. Ord.	22/6—24/6	+2/6	21/6—23/9
28,866	1	Sept. 7	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	22/—24/-	...	...
137,730	Stk.	Aug. 10	7	7	Southgate & Dist. 7 p.c. max.	151—156	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	...
117,228	,,	Aug. 10	6	5	Swindon Cons.	110—115	...	...
60,425	,,	June 22	5	5	Do. 5 p.c. Deb.	120—125	...	...
64,380	,,	June 8	5	5	Torquay and Paignton 5 p.c. Pf.	117—122	...	...
750,000	1	Mar. 30	...	5·52d	*a* Utd. Kingdom Gas Cpn. Ord.	21/3—22/3	...	21/10½—22/-
468,574	1	,,	2½	2½	Do. 4½ p.c. Prefd. Ord....	20/—22/-	...	...
935,902	1	May 18	2½	4½	Do. 4½ p.c. Cum. Pref. ...	21/—23/-	...	22/6—22/10½
600,000	Stk.	Sept. 21	3½	3½	Do. 3½ p.c. Red. Deb. ...	97—100*	...	...
130,000	,,	Aug. 10	8	5	Wakefield Ord.	140—145	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	105—110	...	...
82,000	,,	July 20	6	6	Weymouth Ord.	105—110	...	...
98,384	,,	Aug. 10	6	6	Wolverhampton 6 p.c. Pref.	127—132	...	...
160,000	,,	June 8	5½	5½	Do. 5½ p.c. Rd. Db	107—112	...	...
370,000	,,	July 20	6	4	York Cons.	111—116	...	...
90,000	,,	June 22	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	...
133,640	,,	July 20	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	130—135	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
35,000	,,	June 22	5½	5½	Do. 5½ p.c. Deb.... ...	130—135	...	...

a Actual.

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